American Journal of Public Health
and THE NATION'S HEALTH Vol. XIV No. 1

Volume XXII January, 1932 Number 1

Cost of Sanitary Survey of Streams*

W. L. STEVENSON, F. A. P. H. A.

Chief Engineer, Pennsylvania Department of Health, Harrisburg, Pa.

THE awakened public conscience as to the conservation of water resources and abatement of stream pollution is creating demands upon some state health departments to increase their activities along these lines, upon others to inaugurate such work.

Usually bureaus of engineering of health departments are not overburdened with larger appropriations than they can wisely expend. In fact, generally, great care must be used in allotting the available funds among their many present activities so as to secure the maximum possible returns in protection and promotion of the public health.

Therefore, the cost of making sanitary surveys of streams is an important matter; hence this brief contribution.

The Bureau of Engineering of the Pennsylvania Department of Health is the agent of the Sanitary Water Board in making surveys of streams:

1. To find those which are clean
2. To determine the sanitary condition of the larger streams and rivers
3. To determine and evaluate the source of pollution
4. To lay out practicable programs for sanitary improvement of whole river systems
5. To study, in more or less detail, industrial wastes which cause harmful stream pollution

For the first item (finding clean streams), technically trained men are not needed. The bureau has a corps of "Stream Surveyors" operating under a Chief of Party. It consists of 7 young men, keen to observe, trained to locate themselves in the field from maps, tactful in dealing with citizens whom they interview, and above all else, faithful

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

in doing their work completely. Three of them are only summer employees. Inexpensive automobiles are provided to the number of one-half the corps, save that the Chief Surveyor has one for his own use.

They operate in the sparsely settled parts of the state. Temporary headquarters are established at some small country hotel and working from this as a center actual traverse on foot is made of all the streams in that neighborhood to search for "artificial" sources of pollution such as sewers from dwellings, overhanging privies, discharge from milk receiving stations and the like.

These data are recorded on suitable report forms and noted on field blue print maps to indicate exact location, name and address of responsible party, kind of discharge and idea of abatability.

Most of these minor pollutions are violations of rules and regulations of the Department of Health as to public health nuisances. Where the stream surveyors find such pollutions, they verbally inform the responsible party that abatement should be made, and leave a signed statement of "Advice" as to how to make abatement. A copy of this "Advice" is sent to the main office, attached to the form report on the case. At least two reinspections are made, if necessary to determine whether abatement has been effected. In this informal way innumerable abatements are attained.

Where the advice is unheeded, report is so made to the Central Office and a formal "Abatement Notice" is served by one of the department's inspectors who are enforcement officers, and if this is not complied with legal action is taken pursuant to provisions of Pennsylvania law.

The maps with crayon notations made by the stream surveyors showing those streams free from artificial pollution are first sent to the proper district engineer for review and comment, then come to the Central Office, where they are carefully examined, the miles of clean streams measured, and then submitted to the Sanitary Water Board which thereupon formally designates the clean streams as Class "A." Every possible effort is made thereafter to keep them in that wholesome state. For instance, should a summer hotel be erected on the catchment area of a Class "A" stream, nothing less than complete sewage treatment would be considered or approved by the Sanitary Water Board.

As this work progresses the aggregate mileage of Class "A" streams in Pennsylvania is annually increasing through abatement of these minor pollutions.

The salaries of the Stream Survey Corps total $7,400 a year, for both full-time and summer-time employees. Their living and travel

expenses in the field are paid, including automobile costs, and amount to about $8,000 a year. The total operating cost of the corps is, therefore, about $15,400 a year. Allowing about 20 per cent deduction from this total cost for time spent by stream surveyors on special detached service the net cost of the Stream Survey Corps while on regular duty is about $11,500 a year, and about 3,500 miles of stream can be so surveyed each year. Therefore, it costs about $3.30 per mile of stream, including reinspection for abatements as well as the not inconsequential education of the public which is an important activity of the Stream Survey Corps.

For sanitary surveys of the larger streams and rivers mobile laboratories are used by chemical engineers. Each laboratory is equipped to do dissolved oxygen, 5 days oxygen demand at 20° C., alkalinity or acidity and pH determinations. A new mobile laboratory is also being equipped for bacteriological work including total number of bacteria at 37° C. and presumptive *B. coli* tests.

In the earlier scientific stream studies the large heavy laboratories were driven as near as possible to the sampling point. Experience showed this to be generally undesirable because of difficulties in driving the heavy laboratory over poor dirt roads and lanes leading from the main paved highway down to the river banks. The present practice is to establish temporary headquarters for the mobile laboratory in some town centrally located to the stretch of river under examination and for the engineer to collect samples of the river water using a small inexpensive automobile as a "feeder car."

Automatic gauging stations are established on the river so that rate of flow is known at sampling times. This allows scientific comparison to be made of analyses taken at known different river stages. Sampling is done during the low flows of warm weather, except in cases of streams receiving acid coal mine drainage in which the degree of alkalinity or acidity is the dominant feature. At reasonable stream stages such work can continue nearly all year.

On wide rivers cross-section studies are made because of the influence of tributaries, and in places where heavier pollution is on one side of the stream than the other.

Sampling stations are established above known major discharges and at places below where it is deemed that the discharge has become reasonably diffused in the river water. Also sampling stations are established at the mouth of major tributaries in order to determine whether they are harmful or refreshing influences to the main river. Later similar work is extended up the tributaries which are found to be harming the main stream.

At high river stage and during cool weather the chemical engineers with their mobile laboratories study industrial wastes discharged into the stream. A basic policy in such study is always to endeavor to reach the highest possible official at the factory, explain that the purpose of the survey is to determine scientifically the sanitary condition of the stream, evaluate the sources of pollution, and find reasonable and practicable ways and means for improving the sanitary quality of the river.

In the earlier studies of individual industrial wastes the responsible executives were informed that the survey was not being made to gather information for prosecution and that if access to the factory were granted and the desired information furnished, the data so collected would be for the exclusive use of the state authorities. Such executives of industrial concerns were given a copy of the analytical report bearing a signed statement that the report was for the "exclusive use of the Sanitary Water Board."

This policy made possible the study of industrial wastes unmixed and at their points of origin in factories, where otherwise this would have been difficult, if not impossible to accomplish. The reputation of the Sanitary Water Board and its agents for "square dealing" has become so well known in Pennsylvania that it is now rarely necessary to go through the more or less cumbersome formality of officially guaranteeing confidential treatment of information secured within industrial establishments and, furthermore, the executives of practically all industrial establishments now recognize that, in view of present-day sentiment of the public and governmental agencies, it is unwise to attempt to conceal information concerning their waste water discharges.

No effort is made to measure the rate of flow or sample and analyze municipal sewage. Its load upon the stream is determined by estimating the human population connected to the sewer system and adding thereto the industrial wastes admitted to the sewers converted into equivalent human sewage by computation of B. O. D. figures.

Upon the completion of such a survey diagrams are prepared showing the average dissolved oxygen and oxygen demand in p.p.m. at each station; also by symbol maximum and minimum observations. The difference shows oxygen balance. Per cent saturation dissolved oxygen, alkalinity or acidity, bacteria, etc., are also platted.

On other diagrams the pollution loads producing these conditions are shown by ordinates to a scale of human sewage to which B. O. D. of organic industrial wastes are converted by the factor 0.22 lb. oxygen demand per diem per capita.

These diagrams are used by the excutive engineer of the bureau in recommending degree of treatment of municipal sewage indicated as needed to maintain a sanitary condition of the river fit and suitable for its present and probable future public uses.

They are also used in negotiating with the parties responsible for harmful industrial waste pollution, always first visiting the concern which the diagram shows to be the cause of the heaviest load on the stream or the most harmful, as for instance in proximity to a water works intake.

The salaries and expenses of the chemical engineers and their assistants vary, and hence only aggregate figures can be given.

The records show that salaries, expense accounts, maintenance of mobile laboratories and feeder cars, and other incidental expenses in this field work, exclusive of the salary and expenses of the executive and district engineers engaged in negotiations, have cost about $30,000 for doing work such as described above in an average working year.

Some of the scientific studies are of heavily polluted streams in densely populated and highly industrialized districts, whereas others concern problems involving only a few sources of pollution affecting an otherwise clean stream, and it would be obviously unfair to attempt to compare the costs of surveying equal lengths of such widely different streams. Again, the activities of one year may be centered almost entirely on streams where the problem is very complicated and progress slow whereas in another year the surveys conducted may be largely of streams where results can be secured with less effort and in shorter time. Then too, conditions of stream flow in a given year may not be favorable to scientific surveys and much time may be lost due to interruption of traverse studies by repeated rises in stream stage. However, it is roughly estimated that in an average year of actual field work in scientific stream surveys, including studies of industrial wastes and preliminary negotiations relative thereto, about 300 miles of main stream can be covered. This indicates, as qualified above, an approximate cost of $100 per mile of stream.

It must be borne in mind that a river once surveyed is not by any means a permanently completed job, and that the real success in accomplishing improvement in the sanitary condition of streams is only obtainable by eternal vigilance and repeated surveys. Sewage treatment works become overloaded, industrial waste treatment works may be neglected, new industries may be established, and new methods of waste treatment may be developed which are applicable to previously unsolved problems. As a matter of fact, it has been found necessary, once a study of a large river in a heavily industrialized territory has

been undertaken, to leave one or more men permanently assigned to each project for constant follow-up.

The population of Pennsylvania is about 10 millions; there are nearly 1,000 municipalities more or less sewered and over 2,500 industrial places discharging waste waters. The aggregate length of streams in the state is about 100,000 miles.

For the biennium beginning June 1, 1931, there is available in Pennsylvania for work incident to public sewerage, industrial wastes and sanitary conservation of water resources about $330,000. Of this, $50,000 is a special appropriation to the Sanitary Water Board for a salinity survey of the tidal estuary of the Delaware River, $225,000 to the board for its general work, and the remainder is from the allotment to the Bureau of Engineering from the appropriation to the Department of Health.

Immunization

THE address of Professor Major Greenwood, in opening the section of Pathology at the annual meeting of the British Medical Association, carried forward the work on experimental epidemiology, with which the names of Topley and Greenwood are associated. It brings out two points: first, active immunization is of more importance than primary selection in resisting infection; and, second, the immunity conferred by virus diseases is different (at all events in intensity) from that conferred by bacterial diseases. Both of these propositions have substantial clinical backing.

The safety of any individual in an infective environment depends upon many factors, three of which are personal: initial "strength," immunity produced by contact, and immunity produced artificially. The first is the weakest, the second the strongest. In no case is resistance absolute. The nearest approach to absolute immunity would appear to be a preliminary clinical reaction followed by continuous, somewhat severe, exposure. We should imagine a fever nurse who had had diphtheria to have the maximum possible resistance to a second attack of that disease, yet it is possible even for her to die from it.

Light is also thrown on the value of pre-immunization. Here clinical and experimental work are in complete agreement; immunization tides over a difficult or particularly dangerous period; its effect is not permanent. Diphtheria immunization carries children over the dangerous age of 1 to 7; more than that it probably cannot do, and, generally, no more than that is requisite.—The Difference Between an Epidemic of One Disease and That of Another, *Med. Off.*, Oct. 24, 1931, p. 177.

Diphtheria Toxin-Antitoxin and Toxoid*

A COMPARISON

WILLIAM H. PARK, M. D., F. A. P. H. A., AND
MAY C. SCHRODER, M. D.

Bureau of Laboratories, Department of Health, New York, N. Y.

THESE two preparations, toxin-antitoxin and toxoid, are now being widely used for immunization of infants and young children against diphtheria. Toxin-antitoxin has been longest in use. Behring was the first to employ it experimentally as an immunizing injection in man. His preparation was the undiluted toxic broth with its toxin nearly neutralized by antitoxin. He never gave a clear explanation of how he prepared and standardized it. The breaking out of the war delayed the practical utilization of toxin-antitoxin in Europe.

Park and Zingher were the first to realize that by using the Schick test to determine the susceptibility of the children, and a retest to note the changes in reaction, we could study the immunizing effect of toxin-antitoxin injections in human beings. We demonstrated that immunity developed in about 85 per cent of those receiving 3 injections of our 3 L+ preparation at intervals of 1 week, and by 1917 we realized that it lasted in the great majority of cases for at least several years. We also tried giving it at intervals of 2 weeks, but the results were only moderately better. Schroder followed the Schick reaction in the immunized children for a longer time and in 1925 found that the period of immunity extended to 10 years for at least 80 per cent of them. These were New York City children. As a rule the same children were not retested in order to avoid the possibility of the Schick test adding its immunizing effect. The long duration of immunization might have been due in some to the added immunizing effect of repeated infection from carriers.

In 1918 we began the serious attempt to immunize the whole child population of New York City. This earlier work was concerned mostly with children of school age, as most parents were not yet willing to have the injections given to the babies and very young children. We noted that in a small percentage of the children the injection gave

* Read at a Special Session on Toxoid Immunization of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

quite a severe local reaction. To lessen this, we tried diluting the toxin before adding the antitoxin, and found that when as little as 0.1 L + dose of toxin was given in an injection, the immunizing effect was as good as when a 3 to 6 L + dose was used. Smaller amounts of toxin were less immunizing. The most important point is that the toxin-antitoxin to have its maximum effect has to have such a toxicity that a human dose kills a 250 gm. guinea pig in about 4 weeks. With decreasing toxicity the immunizing effect is gradually diminished.

This new preparation gave much less local reaction in children of school age, since this reaction was due, not so much to the specific toxin as to the other elements, especially the dissolved bacillus substance. It was found that even when the toxin-antitoxin was stored in good glass and kept cool the product became gradually somewhat less toxic. The reverse never happened with the 0.1 L + preparation except when it was frozen and then the increase in toxicity was not sufficient to be in the least dangerous. This characteristic of becoming less toxic is a real drawback, because many commercial preparations suffer this during transportation and the period of storage, and when this happens, 3 injections may cause only 50 to 75 per cent of the children to change from a Schick positive to a Schick negative state, instead of the expected average of about 80 per cent.

When toxin-antitoxin is accurately standardized, a full dose, injected just under the skin of the anterior surface of the arm, acts both as an immunizing injection and as a substitute for the Schick test. The result in the older children is not quite so accurate an index of immunity as that from the Schick test, but the error is on the safe side. This slight difference is due to the fact that a dose of suitable toxin-antitoxin is a little more toxic than the Schick test dose, and also to occasional nonspecific protein reactions. We have found that this use of toxin-antitoxin is a very valuable help among the school children of New York City, since without using the Schick test we are enabled to save fully 50 per cent of them from the second and third injections, as they are shown by their negative reactions to be immune. The readings are not made until the 5th or 6th day, to allow, in most cases, for the disappearance of the pseudo-reactions, which are more pronounced than with the Schick test. The 6th day is also a suitable time for the second injection in those who require it.

The possible objection, when horse antitoxin was used, that the approximately 0.001 c.c. of horse antitoxin in the immunizing dose sensitizes the injected children to later injections of therapeutic doses of an antiserum from the horse, has been removed by substituting antitoxin from the goat. We are convinced that the fear of sensitization

was greatly exaggerated, but it was wise to substitute goat antitoxin to remove any objection. This preparation of toxin-antitoxin is used generally in the United States and has given satisfaction. In New York City alone, during the past 15 years, more than 500,000 school children have been given toxin-antitoxin, and during the past 2½ years, owing to an intensive drive to stamp out diphtheria, inaugurated by the Commissioner of Health, Dr. Wynne, more than 250,000 infants and preschool children have received it. Deaths from diphtheria in New York City during 1930 were only 198 against 416 for 1929, and 800 for 1920. The figures for the first 8 months of 1931 are even better than those of 1930. During this time, the population has considerably increased. All this immunization work was performed without any accident.

Only 4 serious accidents have occurred from toxin-antitoxin injections in other cities of the world, and these would have happened just as readily if toxoid had been used. The first took place in the United States and resulted from the sending by mistake of a proved overtoxic preparation. The second and third happened in Austria and Russia and were caused by the accidental distribution and injection of a diluted diphtheria toxin for toxin-antitoxin; while the fourth occurred in Australia, due to the use of a toxin-antitoxin preparation which had no antiseptic in it and which was stored in large bottles. The contents of one of the bottles after having been opened several times became contaminated by virulent staphylococci.

Within recent years, efforts have been made by bacteriologists to obtain a better preparation than toxin-antitoxin. Park, Zingher and Schroder stated in 1924 that a toxin which had been changed to toxoid by long standing gave remarkably good immunizing results, though the marked pseudo-reactions occasionally caused by it made it less desirable, in their opinion, for school children who made the majority of those being immunized, than the new preparation of toxin-antitoxin. Glenny and his associates, by the use of formalin, reduced toxin to a slightly toxic toxoid, and found this, when its remaining toxicity was partially neutralized by antitoxin, an excellent immunizing agent. Like toxin-antitoxin, the toxoid was diluted and gave less reaction than undiluted toxoid.

The best immunizing material now in use is, however, the *non-toxic* diphtheria toxoid which Ramon developed. He adopted the suggestions of Glenny as to the use of formalin, and of Loewenstein of Vienna as to the value of non-toxic toxoid in tetanus. He was able also to prepare a stronger toxin, and therefore toxoid, than had previously been prepared. Starting with a highly potent toxin, he reduces

its toxicity by the addition of formalin and its storage at 37° C. until it is practically non-toxic. The greater the number of L + doses in the original toxin, the better the immunizing effect of the toxoid. With toxoid sent us by Ramon, or made by Povitzky in our laboratory, we have obtained no greater pseudo-reaction from an intramuscular injection of 0.5 c.c. in little children than from the equivalent dose of 1 c.c. of toxin-antitoxin, and but little more from 1 c.c. injections, but in school children the toxoid preparations produce on the average somewhat more marked reactions than do 1 c.c. injections of toxin-antitoxin.

The immunizing effects of our best toxoid have been better than from the best properly standardized toxin-antitoxin. We have therefore recently adopted the toxoid (Ramon) for the children of preschool age in New York City, but continue to use toxin-antitoxin for the school children and for such adults, as for instance, nurses, who require it. We may soon employ the toxoid entirely, especially, if we are able to reduce the substances in it which cause pseudo-reactions.

We have also recently tried out the inunction of toxoid mixed with lanolin (Loewenstein) and have obtained a change from a positive to a negative Schick reaction in about 70 per cent of the children on whom it was used. The 4 or 5 rubbings were made at weekly intervals. This method has certain advantages in cases where the mothers object to the use of the needle and in institutions where a nurse can apply it to the children as they enter. The ointment should be thoroughly rubbed into the skin. For general use it is more time consuming and less effective than the subcutaneous or intramuscular injection of toxin-antitoxin or toxoid.

INCREASE OF THE POTENCY OF DIPHTHERIA TOXOID THROUGH THE ADDITION OF ALUM

Two years ago, Glenny, working under the direction of O'Brien, found that the addition of sufficient alum to the toxoid to make a 0.2 to 0.5 per cent solution increased appreciably its power to develop antitoxin when injected in horses. We tried his methods with good results. It occurred to us that toxoid containing alum might be advantageously used in infants and children. Schroder injected about 100 children last spring with very favorable results. A report of this was made by one of us at the international meeting of the Microbiological Society at Paris last June. O'Brien told me that they had also tried it in a few children with favorable results. During the past 10 months, Schroder and Blum have injected additional children, and we have made a comparison of the results following the use of toxin-

TABLE I

A COMPARISON OF THE IMMUNIZING EFFECT OF DIPHTHERIA TOXOID, TOXOID PLUS ALUM AND TOXIN-ANTITOXIN IN GUINEA PIGS

Fraction of 1 c.c. Given and Number of Doses	Average Number of Minimal Fatal Doses Neutralized in Guinea Pigs After 1, 2 and 3 Doses of			
	Toxin-Antitoxin	Toxin-Antitoxin Alum	Toxoid	Toxoid and Alum
1/16	1.5	1.5	3	3
1/16, 1/16	3.0	5.0	6	15
1/16, 1/16, 1/16	5.0	15.0	40	60
1/8	1.5	1.5	5	10
1/8, 1/8	3.0	4.0	25	80
1/8, 1/8, 1/8	15.0	25.0	30 +	90 +
1/4	2.0	3.0	10	30
1/2	2.0	3.0	50	80
Total doses neutralized by 8 guinea pigs	33.0	58.0	169 +	368 +

Injections given at intervals of 1 week. Retests done at the end of 2 months. Note the much greater number of fatal doses neutralized by the guinea pigs receiving toxoid, especially by those receiving toxoid plus alum.

TABLE II

THE INCREASED EFFECT OF GIVING A DEFINITE QUANTITY OF TOXOID IN DIVIDED DOSES RATHER THAN IN A SINGLE ONE

	Number of m.l.d. overcome by guinea pig
A single dose of 1/2 c.c. of toxoid plus alum	80
A single dose of 1/4 c.c. of toxoid plus alum	30
Two doses of 1/8 c.c. with interval of 1 week	80
A single dose of 1/2 c.c. of toxoid	50
A single dose of 1/4 c.c. of toxoid	10
Two doses of 1/8 c.c. with interval of 1 week	20
Three doses of 1/16 c.c. with intervals of 1 week	40

antitoxin, toxoid, and toxoid with alum, in the children living in institutions. By dividing them into similar groups and giving children of similar age the injections, we felt we might obtain valuable information. Finally Welton, who has charge of our Otisville branch laboratory, injected some 500 guinea pigs with one or other of the 3 preparations. The results of these tests in children and in guinea pigs are shown in Tables I to VI.

DOSAGE OF TOXIN-ANTITOXIN

The almost universal custom is to give 3 injections of 1 c.c. each. A few have advised 4 or even 5 injections. More than 3 are hardly necessary, if properly prepared and preserved preparations are used. In 149 young children in which 1 c.c. of a well tested preparation was

TABLE III

THE COMPARATIVE VALUE OF INTERVALS OF 1 AND 2 WEEKS BETWEEN INJECTIONS. NUMBER OF INJECTIONS 2 AND 3. MATERIAL TOXOID WITH 0.2 PER CENT ALUM

No. of Pig	1st Dose	2nd Dose	2nd Dose	M.l.d. 8/12/31	Day of Death
	2 Injections				
	7/3/31 c.c.	7/10/31 c.c.	7/18/31 c.c.		
1	1/8	1/8		20	*
2	1/8	1/8		20	*
3	1/8	1/8		30	3rd
4	1/8	1/8		30	**
5	1/8	1/8		30	**
6	1/8	1/8		30	**
7	1/8	1/8		60	*
8	1/8	1/8		60	*
9	1/8	1/8		60	3rd
10	1/8	1/8		100	3rd
11	1/8	1/8		100	4th
12	1/8	1/8		100	2nd
13	1/8	1/8		150	4th
14	1/8		1/8	20	5th
15	1/8		1/8	20	2nd
16	1/8		1/8	30	*
17	1/8		1/8	30	*
18	1/8		1/8	30	2nd
19	1/8		1/8	30	*
20	1/8		1/8	60	**
21	1/8		1/8	60	*
22	1/8		1/8	60	2nd
23	1/8		1/8	100	3rd
24	1/8		1/8	100	*
25	1/8		1/8	100	3rd
26	1/8		1/8	150	*

* Destroyed 8/27/31 because of necrosis at site of toxin injection.
** Still living and healthy, discharged.
Pigs at beginning of immunization weighed from 260 to 300 gm.
Pigs at time of toxin injections weighed from 700 to 900 gm.
The difference shown in these two sets of guinea pigs is very slight.

recently injected by us we obtained 90 per cent of success. With over-neutralized preparations others have obtained at times as little as 50 per cent of immunization.

DOSAGE OF TOXOID

The potency of toxoid depends on the number of antigenic units contained in a specified amount. These can be approximately determined by the L+ doses of the original toxin or by the flocculation units of the toxoid when ready for use. A good preparation and one which should be produced by all biological laboratories contains at least 8 antigenic or flocculation units per c.c. A department of health

TABLE IV

THE COMPARATIVE VALUE OF INTERVALS OF 1 AND 2 WEEKS BETWEEN INJECTIONS. NUMBER OF INJECTIONS 2 AND 3. MATERIAL TOXOID WITH 0.2 PER CENT ALUM

No. of Pig	3 Injections				M.l.d. 8/12/31	Day of Death
	7/3/31 c.c.	7/10/31 c.c.	7/18/31 c.c.	7/31/31 c.c.		
27	1/8	1/8	1/8		30	8th
28	1/8	1/8	1/8		60	
29	1/8	1/8	1/8		60	5th
30	1/8	1/8	1/8		60	5th
31	1/8	1/8	1/8		60	3rd
32	1/8	1/8	1/8		100	*
33	1/8	1/8	1/8		100	*
34	1/8	1/8	1/8		100	**
35	1/8	1/8	1/8		100	**
36	1/8	1/8	1/8		150	**
37	1/8		1/8	1/8	30	*
38	1/8		1/8	1/8	60	**
39	1/8		1/8	1/8	60	*
40	1/8		1/8	1/8	60	**
41	1/8		1/8	1/8	60	**
42	1/8		1/8	1/8	100	**
43	1/8		1/8	1/8	100	**
44	1/8		1/8	1/8	100	**
45	1/8		1/8	1/8	100	**
46	1/8		1/8	1/8	100	**
47	1/8		1/8	1/8	150	**
48	1/8		1/8	1/8	150	**
49	1/8		1/8	1/8	150	**

* Destroyed 8/27/31 because of necrosis at site of toxin injection.
** Still living and healthy, discharged.
Pigs at beginning of immunization weighed from 260 to 300 gm.
Pigs at time of toxin injections weighed from 700 to 900 gm.
The guinea pigs having a 2-weeks interval certainly show somewhat more resistance to the toxin.

TABLE V

A COMPARISON OF THE IMMUNIZING POWER OF TOXOID WITH AND WITHOUT THE ADDITION OF ALUM IN INFANTS AND YOUNG CHILDREN LIVING IN HOME FOR HEBREW INFANTS
THREE INJECTIONS GIVEN AT INTERVALS OF 1 WEEK

	No. of Children 2 Mos. to 2 Yrs.	Number Immunized	Per cent Immunized	No. of Children 2 to 4 Yrs.	Number Immunized	Per cent Immunized
Toxoid 1/2 c.c.	49	44	89.8	33	31	94
Toxoid with alum 1/2 c.c.	35	34	97	21	21	100
Toxoid with alum 1/8 c.c.	43	41	95	13	13	100
Filtrate of Toxoid plus alum 1/2 c.c.	25	0	100	8	0	100

TABLE VI

A COMPARISON OF DIPHTHERIA TOXIN-ANTITOXIN, TOXOID AND TOXOID WITH THE ADDITION OF 0.2 PER CENT OF ALUM AS AN IMMUNIZING AGENT IN CHILDREN.* THREE INJECTIONS OF 1 C.C. OF TOXIN-ANTITOXIN AND 0.5 C.C. OF TOXOID WERE GIVEN. THE INJECTIONS WERE GIVEN AT INTERVALS OF 1 WEEK

Children from 5 to 14 years of age

Immunizing Substance	No. Children	No. Immunized	Per cent Immunized
Diphtheria Toxoid (not toxic)	243	228	93.7
Diphtheria Toxoid (plus alum)	112	110	98.2
Diphtheria Toxin-antitoxin	149	132	90.0

* The children the results of whose immunization are given in the above tables were cared for in 7 institutions. In order to attempt to make the comparison an accurate one, we selected an equal number of children from each institution for immunization by each of the substances. The children were also of similar age groups ranging from 2 to 14 years.

These were all excellent preparations. The toxoid plus alum gave the best results and the simple toxoid the next.

should know that a toxoid supplied by it is of at least this potency. If the toxoid is diluted it should contain at least 4 antigenic units in the dose advised. Such a toxoid is certainly more potent than toxin-antitoxin. Many believe that 2 injections of such toxoid are sufficient. With 3 injections of 0.5 c.c. each, Tables V and VI, we obtained about 94 per cent of successful results. Volk, of Pontiac, using our preparation, but giving only 2 injections of 0.5 c.c. each, obtained only 83.8 per cent in 246 school children. The retests were made at the end of 8 months. Of the children 23 received only 1 injection, and in these only 47 per cent of success was obtained at the end of 2 months and 63.5 per cent at the end of 8 months. It seems, therefore, that 3 doses are desirable if the dose is limited to 0.5 c.c. With 0.5 c.c. and 1 c.c., a somewhat higher percentage of immunization would be obtained, and even higher with 2 doses of 1 c.c. each; but with these there would be occasionally annoying but not serious reactions. Each person must weigh these facts and decide as to whether the possibility of the increased local reaction is a hindrance to the larger dose. It is important that health officials get the most potent preparations available.

MOST DESIRABLE AGE FOR IMMUNIZATION

All are agreed that we wish to treat the children at the earliest suitable age. We found some years ago that infants within a few days of birth did not respond well to injections of toxin-antitoxin. Approximately 2,000 infants were given the first injections on the 2d or 3d day after birth, and in addition 2 more at weekly intervals. There was practically no local or constitutional reaction to the injections, but when 100 of them were retested at the end of 1 year the immunization

was found to be quite disappointing. Recently Schroder has injected groups at ages of 1 month, 2 to 12 months, and over 1 year. With toxin-antitoxin her results were as follows:

No. of Infants	Age when Treated	Age when Retested	Results % Immunized
12	1 month	9 to 11 mos.	75
11	3–7 months	9 to 20 mos.	90
10	1 year	1.5 to 3 yrs.	90
4	1 year (toxoid)	17 months	100

These results taken together with those given me by Blum and shown in Table V, suggest that at 3 months or after, babies are suitable for immunization, so far as their immunity response is concerned. As to the most suitable age, other factors are of importance. In cities the new-born babies are usually immune through the transfer to them before birth of antitoxin from their mothers, while in the country the majority are susceptible. This passive antitoxic immunity lasts 6 to 12 months. For this reason the age chosen in cities as the desirable one is usually 6 to 9 months, while in the country it is usually 6 months. Another reason for waiting until the babies are at least 6 months of age is that very young infants are more apt to suffer from intestinal and other disturbances. Fortunately the earlier in life the toxin-antitoxin or toxoid is given, the less the annoyance—in fact in babies under 2 years an intramuscular injection of toxoid is not usually followed by any appreciable reaction. The toxoid gives on the average a local reaction 25 per cent more severe than does the toxin-antitoxin. Deep intramuscular injections give much less frequent and severe local reactions than subcutaneous ones.

We may sum up as follows: Non-toxic diphtheria toxoid or anatoxin is undoubtedly the best preparation for young children and probably for older ones because it is the most potent and stable immunizing agent. Suitable underneutralized toxin-antitoxin is however an efficient preparation and is only a little less immunizing than toxoid, and it has the advantage of causing less nonspecific reactions in older children. It is to be remembered that in most toxin-antitoxin preparations, the "toxin" is really mostly toxoid, since the toxin has been kept for a year or more. This allows it to become more stable and more efficient. It is difficult to decide which method should be preferred for older children. Each has its advantages. The use of toxoid mixed with lanolin, and rubbed into the skin has a distinct place, as for example, for children in institutions or in cases in which there are objections to the use of the "needle." Alum 0.1 or 0.2 per cent,

added to the toxoid adds to its immunizing power, as is also the case when it is added to toxin-antitoxin, only then to a much less extent.

It is of the greatest importance that the toxoid be made from highly potent toxin and that the antigenic units should be stated on the containers. If it is diluted, this should be stated on the label. Toxin-antitoxin should be properly standardized and have the desired toxicity. In large cities such as New York we find toxin-antitoxin has an advantage, in older children, for the injection acts not only as an immunizing dose, and gives on the average less local reaction, but because it is also a substitute for the Schick test. The exclusion of the negatively reacting children cuts down the number of later injections. For the second and third injections in these older children, either toxin-antitoxin or toxoid may be used.

A Schick retest 3 to 4 months after making the immunizing injections is always desirable but not essential, for only in this way can we be absolutely sure that the desired effect has been obtained. The tables here present some of the evidence upon which our opinions were formed.

NOTE: A part of the expense of this investigation was provided by the Committee on Administrative Practice of the American Public Health Association from an appropriation made to it by the Commonwealth Fund.

Premiums to Mothers, Liége, Belgium

TO overcome the indifference of women to prenatal work and to infant health work, the municipal council of Liége, on July 1, 1931, offered premiums of 200 francs each to expectant mothers who attended regularly a prenatal health center or were examined by their own physician at least once before the end of the 6th month of pregnancy and not less than 3 times during the entire pregnancy, and who have had their infants regularly examined either at a health center or by the family physician. The premium is paid 3 months after the birth of the child.—*Oeuvre Nationale de l'Enfance, Revue Mensuelle*, Brussels, July, 1931, p. 776.

Advantages of Toxoid in Diphtheria Prophylaxis*

WALTER T. HARRISON

Surgeon, U. S. Public Health Service; National Institute of Health, Washington, D. C.

ACTIVE immunization against diphtheria has developed during the past 15 years, particularly in North America, into one of the most important specific measures for the prevention of disease. Prior to the use of toxin-antitoxin mixture, smallpox vaccination was considered the most successful individual specific procedure in preventive medicine; but improvements in methods of diphtheria prophylaxis have been so great in the past few years that one can safely say that immunization against diphtheria is at least as satisfactory as vaccination against smallpox.

Since no one now-a-days questions the effectiveness of immunization campaigns on incidence of diphtheria as reflected in both cases and deaths, it is only necessary to cite in passing the experiences of Auburn, N. Y.,[1,2] Grand Rapids, Mich,[3] and New York City,[4] without going into detail as to the tremendous reduction in both cases and deaths in these places, for which accurate records are available.

We are familiar with the extreme difficulty experienced by workers in reaching the most highly susceptible children for immunization, and since these children are reached with such difficulty it is important that we use the immunizing agent which will produce immunity in the greatest number of subjects injected. Toxin-antitoxin mixture and toxoid are both being used and we all wish to know which, if either, is the superior product, and the advantages and disadvantages of both.

Toxin-antitoxin mixture is made from mature toxin by adding sufficient diphtheria antitoxin so to decrease its toxicity that it may be safely injected. This delicate balance is readily attained by experienced manufacturers working with toxins and antitoxins, the values of which are accurately known.

In the beginning mixtures were made by adding antitoxin to the undiluted toxin—hence the original mixtures containing from 3 to 5 L+ doses of toxin per human dose. Some of us will probably re-

* Read at a Special Session on Toxoid Immunization at the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

member those mixtures with the amber color of broth, which gave in older children and adults local and general reactions of the same general nature as those observed at present in the same age groups with toxoid. These mixtures containing at least 3 L + doses of toxin were used universally until 1922, when the amount of toxin was reduced 30 times, or to the present 0.1 L + mixture. The amount of unneutralized toxin, however, remains the same as in the older mixtures. This small amount of toxin has caused these allergic reactions in older children and adults practically to disappear, but in susceptible individuals the local reaction will always be encountered. In fact, the absence of local redness and swelling, with heat and tenderness, should indicate either that the patient is immune or that the mixture is not of proper toxicity. In very susceptible persons, and with strong mixtures, an occasional general reaction is encountered, with malaise, occasional vomiting, and fever.

The antitoxin used in toxin-antitoxin mixtures up to a few years ago was obtained from immunized horses, but about 1924 evidence began to accumulate that this small amount of horse serum would sensitize a considerable proportion of individuals so that severe serum sickness would follow later therapeutic injections. An occasional case of what could not be differentiated from the phenomenon of Arthus[6] was reported in humans.

Hooker[6] in 1924 showed by specific skin tests that a considerable number of patients who had received toxin-antitoxin mixtures, and no horse serum from other sources, would react to an intracutaneous injection of horse serum.

Gordon,[7] at the Herman Keifer Hospital in Detroit, found that the excessive number of serum reactions following scarlet fever streptococcus antitoxin was probably due to the use of horse serum in a selected group who had received sensitizing injections of toxin-antitoxin mixture. He showed that scarlet fever antitoxin was no more prone to produce unpleasant reactions than diphtheria antitoxin, when given to a child who previously had not received toxin-antitoxin mixture, or other horse serum injections. These data have led the manufacturers to substitute in toxin-antitoxin mixture antitoxin prepared by immunizing goats and sheep, which products are now widely available. In the light of our present knowledge of the sensitizing effect of minute doses of horse serum, and since effective preparations containing goat or sheep antitoxin are available, the use of horse serum toxin-antitoxin mixtures should be discouraged.

Considerable difficulty has been encountered with toxin-antitoxin mixtures with respect to the effect of freezing. Formerly freezing took

place only in the winter in cold climates, but of late the introduction and wide use of automatic refrigeration has increased our difficulties in this direction. Phenol or tricresol-preserved mixtures when frozen either lose their immunizing properties and become totally inert, or become toxic. The increase in toxicity in 0.1 L+ mixtures is not sufficient to endanger life, since the original amount of toxin in this formula is not more than 3 to 7 guinea pig m.l.d.'s and a very small proportion of the original amount is released. The increased toxicity, however, is sufficient to produce unpleasant local and general reactions, and may react unfavorably upon a campaign for diphtheria prevention. These mixtures, after having been frozen and thawed, are always turbid or slightly opalescent, due to the precipitated antitoxin which does not again go into solution. Mixtures should be stored in the warmest part of the refrigerator, which usually will be found on the top shelf, at the level of the coils. Mixtures which are not crystal clear should be discarded.

The 0.1 L+ mixtures are not particularly stable and should therefore be kept in the refrigerator except when actually being used. Containers which have been removed for use should be returned to the cold as soon as possible. The highly diluted toxin does not retain its activity very long at room temperature—hence, the short expiration date, 6 months from date of manufacture. A shorter date would so interfere with distribution as to render manufacture and distribution very difficult.

The immunizing value of toxin-antitoxin mixture as reported by various workers varies within rather wide limits. Some report as low as 50 per cent successful immunizations following one course of injections as measured by the Schick reaction, while others report as high as 85 per cent. Such wide variations in results by different workers may be due in some part to the tendency of mixtures to deteriorate and to variations in strength of different Schick outfits. Our own experience in the Washington schools, using mixtures at least as active as the average obtainable in the market, yielded 64 per cent successful immunizations from 3 injections. The Schick test toxin was carefully titrated and diluted each day from the bulk. From figures reported by various workers and covering all working conditions it would seem that 70 per cent successful immunizations from 3 injections would be a fair estimate of the general effectiveness of toxin-antitoxin mixture.

Diphtheria toxoid was first applied to the immunization of humans by Ramon, of the Pasteur Institute, in 1923. Ramon has named his product "Anatoxine," but English speaking countries have adopted the name "toxoid" to avoid confusion with *antitoxin*, with the probable unfortunate results which such confusion would cause.

Toxoid is prepared by adding from 3 to 4 c.c. of commercial formalin to toxin, and subjecting the mixture to a temperature of 39° to 40° C. until all toxicity is lost, which usually takes place in from 3 to 6 weeks.

The specifications for toxoid manufactured or sold in the United States are supplied by the National Institute of Health of the U. S. Public Health Service, and, roughly, are as follows:

The toxin before detoxification must contain not less than 400 m.l.d.'s, or 5 L + doses. Detoxification must be so complete that 5 human doses when injected into guinea pigs must show no signs of early or late diphtheria poisoning. The antigenic efficiency must be such that the initial human dose will immunize 80 per cent of guinea pigs in 6 weeks to such a degree that 5 m.l.d.'s of toxin will fail to kill in 10 days. This antigenic value, as measured in guinea pigs, is much greater than that of toxin-antitoxin mixture; as a matter of fact, active toxin-antitoxin mixtures are so toxic for these animals that one strong enough to immunize in 1 c.c. doses kills such a high proportion as to interfere seriously with the antigenic test.

The only protein constituents of toxoid are derived from the meat and peptone used in the broth, together with the products of metabolism of the diphtheria bacillus. It contains no serum of any kind and can, therefore, be given without fear of sensitizing to a later therapeutic dose of serum. Toxoid is very stable; the expiration date is now 18 months from the date of manufacture, and data are accumulating which may justify the extension of this period. Freezing does not seem to change it, and no physical or chemical treatment yet applied has succeeded in restoring any degree of toxicity.

As with all new products, doses of various sizes and to be given at different intervals have been suggested. Most manufacturers in the United States supply the material in packages containing 2 doses of 1.0 c.c. each and recommend an interval of from 3 to 4 weeks between doses. Since immunity depends upon the presence of diphtheria antitoxin in the blood of the subject, and as the formation of antitoxin is a slow process, better results should be obtained by using the longer interval. There is considerable experimental evidence, first presented by Glenny and Sudmersen,* which indicates that second doses given after an interval sufficient to permit a maximum reaction from the first will result in a larger response than if both doses are given with a shorter interval. In our work in Washington we found that the interval of 1 month gave very good results and was also convenient from the administrative viewpoint. The question of dosage and interval between doses will, no doubt, work itself out without difficulty as more

and more of the material is used by different workers. Two doses with the 30-day interval certainly will produce better immunity than 3 doses of toxin-antitoxin mixture given at intervals of 1 week.

The only obstacle in the way of the universal use of toxoid is the tendency to cause local and general reactions in older children. These reactions are allergic in nature and all are agreed that they are only unpleasant and never dangerous. Practically all young children give absolutely no local or general reaction, the trauma of the injection being all that can be seen. These are the individuals most susceptible to diphtheria, and it is in this group that any prophylactic measure finds its greatest usefulness. In the registration area in the United States for 1928 there were 8,263 deaths from diphtheria, of which 60 per cent were in children under 5 years of age; of this group, the 1st, 2d, and 3d years furnished the largest number of deaths. It is probably a conservative statement that the immunization of 1 child in the first 5 years of life is equal in its effect upon the diphtheria death rate to the immunization of 3 school children.

Older children and adults may be immunized with toxoid, but it is good practice to test for sensitiveness to the diphtheria proteins before the immunizing injections are begun. This test may be carried out either alone or as a control for the Schick test. A small vial of diluted toxoid 1 in 20 is furnished by the manufacturers, and 0.1 c.c. is inoculated intracutaneously, as for the Schick reaction. A local area of redness at the site of the inoculation more than ½ inch in diameter appearing within 3 days is interpreted as a positive reaction, and indicates that the individual may give a local or general reaction to toxoid. These persons may receive toxoid in smaller doses, the first dose ranging from 0.2 to 0.5 c.c. of the 1:20 dilution, depending upon the degree of reaction to the intracutaneous test. Subsequent doses may be given at intervals of 2 weeks, and may be doubled if the local reaction from the preceding dose was not more than ¾ inch in diameter. Reactions up to 3 inches in diameter call for a repetition of the first dose, while more severe reactions should cause the subsequent dose to be reduced. According to Defries,[7] these reactors are more easily immunized than individuals who are not sensitive to the diphtheria protein.

The use of the preliminary Schick test in the older school children will enable the worker to eliminate an increasing number of immunes from the group to be immunized as the age increases, and when only 2 doses of toxoid are required as compared with 3 doses of toxin-antitoxin mixture, the worker will be required to see the subject the same number of times as when giving toxin-antitoxin mixture without preliminary test. Only a very selected group of adults will require im-

munization, those coming in close contact with cases of diphtheria—e.g., nurses, internes, and hospital attendants—and these would in the ordinary course of events be Schick-tested prior to immunization. Adults who fail to react to toxoid given intracutaneously may for purposes of immunization be considered in the same class as infants.

A surprisingly small number of controlled experiments using toxoid and toxin-antitoxin mixtures have been done. Some rather extensive work is now in progress and additional information on the relative value of the two products in actual use should soon be available.

Dick and Dick[10] report comparative results with toxin-antitoxin mixture and toxoid in 2 groups of 100 each, consisting mostly of adults. Five doses of toxin-antitoxin mixture, beginning with 0.5 c.c. and followed by 4 doses of 1.0 c.c. each at weekly intervals, produced a negative Schick reaction in 82 per cent after 3 months. Three doses of toxoid—the first 0.5 c.c. followed by 2 doses of 1.0 c.c. each with intervals of 3 weeks between doses 1 and 2, and 15 days between doses 2 and 3—produced 94 per cent negative Schick reactions in 6 weeks. They conclude that 3 doses of toxoid are more effective than 5 doses of toxin-antitoxin mixture.

Adams,[11] reporting for 1926–1927 in the Canadian cities adjoining Detroit, states that among 11,000 children who had received 2 doses of toxoid the diphtheria rate was 1.55 per 1,000, while for the same period among 9,000 controls the rate was 11.44 per 1,000, and that at the ages 7 years and younger there were no reactions worth mentioning.

Ramon and Helie[12] state that 3 doses of toxoid—0.5, 1.0, and 1.0 c.c. with intervals of 3 weeks between the first and second doses, and 15 days between the second and third doses—will immunize more than 90 per cent children and adults.

Dr. Sumner[13] of the Webster Parish Health Unit, Minden, La., states that he has used toxoid in immunizing approximately 2,000 persons—2 doses each—without unfavorable reactions having been brought to his attention. These subjects ranged from 6 months to 23 years, with the greatest number included in the years 6 to 16.

Schwartz and Janne,[14] reporting on about 14,000 children in the Milwaukee schools, retested after 3 doses of toxin-antitoxin mixture, state that from 62 to 85 per cent were negative to the Schick test; 104 preschool children immunized with toxin-antitoxin mixture prepared from sheep antitoxin showed 71 per cent Schick negative after 6 months. Ninety-three children were injected with 3 doses of toxoid, 0.5, 1.0, and 1.0 c.c., with an interval of about 3 weeks between doses; 98 per cent were rendered Schick negative. Reactions were absent in preschool and school children up to 7 years.

In Washington[11] we compared commercial toxin-antitoxin mixtures and commercial toxoids among school children (ages 5 to 16 years), with a few preschool children under 5 years of age. The materials used were not selected from highly antigenic lots but were chosen as routine manufacturers' samples. The Schick test material was prepared at the National Institute of Health, and the same lot was used both for the preliminary and post-Schick tests. Three doses of toxin-antitoxin mixture were given with an interval of 1 week between doses. Of 355 children tested after 104 to 195 days, 64 per cent were Schick negative. To 86 children 3 doses of toxoid were given—0.5, 1.0, and 1.0 c.c., with an interval of 1 week between doses; 92 per cent were Schick negative after 133 days. Two doses of toxoid of 1.0 c.c. each were given to 318 children, with an interval of 31 days, and after 119 days, 94 per cent were Schick negative. Seventy-two children received 2 doses of toxoid, 1.0 c.c. each with an interval of 42 days, and after 99 days all but 1 were Schick negative. Thus, of 475 children retested from 90 to 133 days after receiving toxoid, 95 per cent were Schick negative compared with 64 per cent of 355 children who received toxin-antitoxin mixture.

The preliminary Schick test was controlled with toxoid 1:20, and all children reacting to this intracutaneous test were injected with toxin-antitoxin mixture. There was therefore no local or general reaction in any child who received toxoid. It is very apparent from these figures that toxoid in 2 doses with an interval of 1 month will immunize from 20 to 30 per cent more children than will 3 doses of toxin-antitoxin mixture at weekly intervals.

Any non-toxic, non-sensitizing antigen which will give such excellent results certainly deserves the attention of the health worker, particularly since its use is followed by so little local or general disturbance in the age group which most critically needs immunization.

For children up to and including 7 years, toxoid may be used without previous test with the expectation that occasionally local reactions will occur, and very infrequently a general reaction, with headache, fever, malaise, will also be encountered. These reactions are also seen when using toxin-antitoxin mixture, but are not given so much attention, probably because a reaction of some sort is seen in all. Children over 7 may be tested for hypersusceptibility to toxoid, and those showing no reaction, or reactions less than ½ inch in diameter, may be given toxoid in full doses. Reactors—those giving a local reaction to the toxoid test—may be immunized with reduced doses of toxoid. As additional reports are received from workers who use toxoid in school children up to 10 or 12 years without previous test, and with only

negligible reactions in those over 8, the test for hypersusceptibility to toxoid will, no doubt, be discontinued. Until this time arrives, and pending our acquiring a greater familiarity with toxoid, we will probably continue to test the older children.

Briefly, the advantages of toxoid over toxin-antitoxin mixture may be summarized as follows:

1. It is from 20 to 30 per cent more effective, even when only 2 doses are given.
2. It contains no serum or other animal protein likely to sensitize to a later therapeutic serum injection.
3. It is absolutely without local or general reaction in practically all children under 7 years of age. Reactions in older children and adults are only unpleasant, not dangerous.
4. It contains no free toxin.
5. It is more stable, retaining its effectiveness for a longer period, and is not affected by freezing.

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Experiences with Diphtheria Toxoid in Canada*

J. G. FITZGERALD, F. A. P. H. A., R. D. DEFRIES, F. A. P. H. A., D. T. FRASER, P. J. MOLONEY, AND N. E. McKINNON

University of Toronto, Toronto, Canada

VACCINATION against diphtheria in Canada, as elsewhere, is of recent origin. The employment of Ramon's anatoxin or diphtheria toxoid, as it is more widely known in the United States and Canada, dates back to 1925. Prior to that time diphtheria toxin-antitoxin mixtures had been used in a few communities in Canada, chiefly in the provinces of Ontario and Saskatchewan, on a moderate scale. Beginning in the autumn of 1924 laboratory investigations confirmed the observations of Ramon that this material was, if prepared according to the directions of Ramon himself, (a) quite innocuous, if employed in proper doses, (b) highly antigenic, and very stable (*60° C. for 3 hours*), (c) quite readily prepared, if supplies of potent diphtheria toxin were available for the purpose, and (d) susceptible of reasonably satisfactory assay by means of protection tests using lethal doses of diphtheria toxin, in guinea pigs; skin tests in rabbits or guinea pigs; or by means of the flocculation test of Ramon.

This incomplete list of the advantages which toxoid possesses may be supplemented by the statement that results obtained in the vaccination of a group of young adults revealed the fact that the immunizing qualities of this prophylactic were as readily demonstrable in human beings as in experimental animals.

Upon the completion of this preliminary work, arrangements were made in a number of centers for more extended use of diphtheria toxoid prepared in the Connaught Laboratories. These further trials, notably in Hamilton, Windsor, and Brantford, Ontario, were eminently successful. Very quickly the use of toxoid spread to other parts of Canada and soon its employment upon a large scale was undertaken. This very satisfactory state of affairs has continued, and in the past 6 years sufficient toxoid for the vaccination of over 1,000,000 persons has been distributed in the Dominion.

* Read at a Special Session on Toxoid Immunization of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

Since the methods of preparation and testing are well known and have previously been presented in meetings of this Association, they will not be dealt with at this time. However, certain additions to knowledge of the subject which it is believed have accrued from studies carried on in this country seem worthy of brief reference. In this category may be included the observations which have revealed the fact that it is possible to adjust the dose of toxoid so that local and general reactions of any degree of severity can practically be avoided. From the outset, insistence upon the importance of early vaccination against diphtheria has been frequently reiterated. The time of election is the preschool age period and any time after the 1st year of life seems to be suitable. Again, a thoroughly critical appraisal of the results of large scale employment of toxoid has recently been made in Canada. The results of these studies of McKinnon, Ross and Defries have recently been published. Quantitative estimation of the antigenic response to injections of toxoid has been carefully recorded by Drs. Donald T. Fraser and P. J. Moloney and Miss C. J. Fraser. It is desirable, perhaps, to deal at a little greater length with some of the points above referred to.

In the period 1921–1924 in Canada, diphtheria ranked first as a cause of death of the age group 2–14 years. It accounted for over 15 per cent, or 1 in every 7 of the deaths in that age group. The annual mortality rate per 100,000 population varied from 14 to 23. The number of deaths in a year varied from 1,281 to 2,072. In general, throughout Canada the mortality rate has been falling during the past 30 years while the morbidity rate has remained practically stationary. It is highly significant that approximately one-quarter of the cases and one-half of the deaths occur in the age group under 5 years.

When toxoid was first distributed in Canada, 2 doses were recommended. Blood titration for antitoxin content, however, showed that 2 doses produced 1/25 unit or more of antitoxin per c.c. of serum in 70 per cent of the vaccinated persons. This finding led to the addition of a third dose which, as will be shown, increased the percentage to a satisfactory level. Blood titration in various groups has shown that 3 doses result in the production of 1/25 unit of antitoxin in fully 90 per cent.

As mentioned previously, the recognition and detection of persons who might react unfavorably to toxoid was rendered possible by the introduction of the reaction test by Moloney. Further work has shown that such individuals are readily immunized without accompanying reactions if given graduated doses of toxoid.

The material used in the reaction test is suitably diluted toxoid.

One-tenth c.c. is injected into the skin of the forearm. The size and degree of the reaction in 24 to 48 hours is an index of the reaction which may be expected if prophylactic doses of toxoid are given. The test is used as a gauge of the individual's sensitivity to toxoid. For convenience the readings of these tests are recorded as 1+, 2+, or 3+; 1+ signifies an area of redness no greater than 1 cm.; 2+ an area of redness greater than 1 cm., but with little or no induration; 3+ indicates definite induration at the site of the injection. Canadian experience, notably that of Burke and his colleagues, has shown that individuals who exhibit a negative, or a 1+ reading, can be given the regular dosage of toxoid without question. Those showing a 2+ reading should be given smaller doses, and the few showing a 3+ should be given a specially diluted toxoid. To facilitate the immunization of such markedly sensitive individuals, suitably diluted toxoid is now distributed in Canada. In over 30,000 children in Toronto, in whom the reaction test readings were recorded, the vast majority, 84 per cent, had no reaction or at most a very slight one. These school children were given the regular dosage without showing subsequent reaction. Five per cent of this large group showed a 2+ reading. These were given smaller doses without producing significant reactions. The readings in these 30,000 children show too that the degree of reaction to the reaction test, and therefore to toxoid, varies with age. In preschool age children, a very small percentage showed any reaction to the test and none showed redness of any significant degree. As the child grows older and perhaps becomes sensitized by contact in a diphtherial environment, he is more likely to show reaction. Of those in the school age group of 5–14 years, 10 per cent exhibited a 3+ reading, this being confined chiefly to the older children. Our experience has also shown that those who do present reaction to the test are more readily immunized than others, so that very small doses of diluted material serve in the vast majority to bring the antitoxin content up to the requisite level.

The results of toxoid immunization can be measured in three ways:

1. By testing (Schick tests or blood titration)
2. By comparing the amount of diphtheria in a group of adequate size who have received toxoid, with the amount of diphtheria in a group of the same age distribution and living under similar conditions but not given toxoid
3. By comparing the morbidity and mortality rates in a community before and after the use of toxoid

Blood titrations before and after immunization have shown that in individuals who had less than 1/50 unit before immunization, 90 per cent had 1/25 unit or more antitoxin after receiving 3 doses of toxoid.

In the analyses of the diphtheria cases which occurred in 16,829 Toronto school children who were given 3 doses of toxoid, 0.5 c.c., 0.5 c.c. and 1 c.c. at intervals of 3 weeks, and 8,994 who were given 2 doses of toxoid, 0.5 c.c. each with a 3-weeks interval, and observed for a period from 1 to 3½ years, it has been estimated that during the period of observation, had diphtheria occurred in the treated children at the same rate as in the control group of the same age and under the same conditions of exposure, namely, that of the public school, there would have been expected 222 cases in those given 3 doses of toxoid. There were actually 23 cases reported and among these not one death occurred. This is a reduction of 90 per cent for the whole period. In the first year following immunization the reduction in diphtheria was from 95 to 100 per cent. In the 8,994 children given 2 doses, 200 cases might have been expected; 52 were reported, a reduction over the whole period of 74 per cent. An interesting parallelism between the antigenic response in individuals vaccinated with toxoid and the degree of community protection against diphtheria which resulted is evident in the above figures. The results of the assays of the serums of those given 2 doses of toxoid showed that about 70 per cent were immune and the statistical evidence indicates a reduction in diphtheria mortality in that group of 74 per cent. Furthermore the percentage of individuals immunized when 3 doses of toxoid were given, as determined by blood titrations, was 90 per cent and the reduction in diphtheria mortality in the group of Toronto school children was 90 per cent.

The results in Hamilton, with a population of 150,000, and Brantford, with a population of 18,000, may be quoted as examples of municipalities that have practically eliminated diphtheria. Other experiences such as that in Windsor might also be quoted. Data from the province of Manitoba recently presented by Dr. F. W. Jackson suggest that widespread immunization in that province is a factor which accounts for the unprecedentedly low figures of diphtheria in the past year and the first months of this year.

The efficiency and practicability of toxoid, properly prepared, as an immunizing agent against diphtheria, is established.

Degree of Immunization from Injection of Diphtheria Toxoid*

(a) of Different Strength Toxoids (b) at Varying Intervals (c) of Treated Toxoids

O. R. POVITZKY, M. D., DR. P. H.

Bureau of Laboratories, Department of Health, New York, N. Y.

BECAUSE the introduction of practical administration of diphtheria toxoid is quite recent we have not as yet arrived at a definite dosage for immunization against diphtheria. The National Institute of Health in Washington has issued definite minimum requirements for the production and administration of toxoid, namely: the original toxin should not contain less than 5 L+ per c.c.; the maximum dose should not exceed 1 c.c. of the undiluted toxoid. The toxoid must protect at least 80 per cent of guinea pigs for 10 days when injected with the initial human dose against 5 m.l.d.'s.

While these requirements are a great safeguard against conversion of worthless toxins into toxoids, we are still in the dark as to the exact dosage of toxoid required for immunization. Ramon's experience has been with toxoids of at least 10 antigenic units per c.c. He obtained immunity in 95–98 per cent of cases by giving 0.5 c.c., 1.0 and 1.5 c.c. of toxoid at intervals of 3 weeks after the first and 2 weeks after the second injection. Park is giving 3 injections of 0.5 c.c. of our toxoids which also average around 10 antigenic units. Other workers report more or less favorable results describing the quantities of the toxoid administered in cubic centimeters and at different intervals, but seldom mention the strength of the toxoid. We may in time be able to decide what minimum dosage of toxoid will insure adequate immunity. But in order to define this amount the toxoids should be standardized by the number of antigenic units per c.c., and the workers should tabulate their results according to the antigenic units administered.

Fortunately we have a very effective means of establishing such a unit † in the Ramon flocculation test, Ramon[1] found how uniform such

* Read at a Special Session on Toxoid Immunization of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

† Schmidt of Copenhagen suggests the unit be called "Immunizing Unit" (U.I.) in distinction from Antitoxic Unit (U.A.).

a standard could be, when he tested 11 lots of toxoids prepared in different laboratories from various parts of Europe. His results by this test agreed very closely with those of Schmidt of Copenhagen. The same results were obtained with both the French and Danish antitoxins.

RAMON FLOCCULATION TEST

Because many readers may not be familiar with it, the author thinks it necessary to describe briefly this important test which is gradually replacing the use of guinea pigs in immunization work in diphtheria. In 1922 Ramon of the Pasteur Institute in France introduced a practical and simple method of standardizing diphtheria toxins and antitoxins by means of the test tube.

The test is based on the previously found principle that when toxin is brought in contact with antitoxin in suitable proportions, namely, to effect a neutralization or a saturation, a reaction occurs. This manifests itself first in clouding up of the mixture, then formation of flocculi, which finally fall to the bottom, leaving the supernatant fluid clear again. The test is set up with varying amounts of antitoxin and equal amounts of toxin per tube—usually 1–4 c.c., depending on the strength of either the toxin or antitoxin. The test is kept at the water bath at 55° C. For titrating toxin or toxoid a standardized antitoxin is used; for titrating antitoxin, a standardized toxin. The first tube which shows a reaction is called the "*indicating tube*" and corresponds to the neutralized or saturated mixture. From the amounts of toxin and antitoxin which enter into this reaction, the titer of either the toxin or toxoid as to the number of antigenic or flocculating units per c.c., or of the antitoxin as to the number of antitoxic units per c.c., is calculated. No reaction occurs with an excess or too small amounts of antitoxin to effect a neutralization. But reactions do occur on either side of the *indicating* mixture later on, when the amounts of antitoxin are on the borderline for neutralization. It is therefore important to watch carefully for the *first tube* showing the reaction, because this is the *specific* reaction and usually corresponds with that in the guinea pig, as far as the L + dose or antitoxic units are concerned.

For titration of toxoids, this test is invaluable. The toxoids show the same titer by flocculation test as the original toxin, though the time for the reaction is slightly delayed. The present standard of the National Institute of Health in Washington calls for the minimum of 5 L + doses per c.c. of the original toxin. This should correspond conservatively to at least 5 antigenic or flocculating units in the resulting toxoid by the Ramon test. In examining the products from different manufacturers on the market, the author found that one toxoid showed 6.8 to 7 antigenic units; one showed 4.4 and one 4.2 antigenic units per c.c. Two (diluted) showed no antigenic units by flocculation. One (non-diluted) showed no flocculation though kept in the waterbath almost a week. It is against such variations we have to

guard. The flocculation test tells us promptly whether the toxoid conforms to the requirements from Washington as far as the value of the original toxin goes.*

Since 1924 we have been constantly guided by the Ramon flocculation test[2] in all phases of toxin, toxoid, and antitoxin production work for the testing of antigenic or antitoxic units. We follow the progress of our toxins[3] from day to day by this test, and convert a toxin into a toxoid[4] only when it gives a flocculation reaction with our standard antitoxin in the proper proportions in from ½ to ¾ hour. The promptness of the reaction in the freshly prepared toxin is dependent on the number of L + doses per c.c. and in the toxoid on the number of antigenic units per c.c. An antigenic unit has the ratio of 1:1 to the antitoxic unit. If, say, 11 antitoxic units produce the specific flocculation with 1 c.c. of the toxin or toxoid—1 antigenic unit is equal to 1/11 and 1 c.c. of the toxin or toxoid to 11 units. The weaker the toxin or toxoid, the more delayed the reaction. The reaction is also delayed with concentrated toxoids and it is sometimes necessary to blend it with the crude toxoid for the test and then estimate the titer. The slowness or promptness of the reaction of the antitoxin on the other hand, is not dependent on the antitoxic units, but is a characteristic of the horse, and this is maintained throughout the immunization period. It is well to keep this fact in mind in following up the progress of immunization in horses. The discrepencies between guinea pig and the Ramon test reported by different authors, including the writer, are usually due to the wrong proportions between toxin and antitoxin. Since 1925[5] when the characteristic of the horse as to the slowness or promptness of reaction was noticed, our results have been more reliable and specific. When a serum gives a reaction at the usual temperature with the standard toxin in 2, 3 or more hours, when it should give it in 1 hour, we know that the amounts of toxin and antitoxin are not proportionate. The test is repeated several times until the reaction is obtained within the proper time. The Ramon test, when the amounts of toxin and antitoxin are proportionate, is, in the opinion of the author, one of the most reliable we have. The reactions which occur later on either side of the indicating tube are not specific and may lead to wrong calculations.

We are guided by the Ramon test in preparing mixtures of toxoid with different percentages of alum. In the purification of toxoids

* In our opinion the requirements of the National Institute of Health for the potency of the toxoid are inadequate. Toxin-antitoxin is of necessity given very cautiously and the demand for protection against 5 m.l.d's. cannot be exceeded. This is not true of toxoid and a much higher standard for protection can be required. At present the producer can ignore the initial requirements or greatly dilute a good toxoid to the minimum of antigenic units and still comply with the requirements from Washington as far as the final product is concerned.

TABLE I

COMPARATIVE TESTS IN THE PRODUCTION OF IMMUNITY IN THE GUINEA PIG WITH ONE DOSE OF DIFFERENT TOXOIDS AFTER 6 AND 7 WEEKS

Toxoid 903 Dose 0.5 c.c. 5.9 Antigenic Units per c.c. *Tested after 6 weeks*					Toxoid 901 Dose 0.5 c.c. 7.6 Antigenic Units per c.c. *Tested after 6 weeks*				
No. Pigs	No. m.l.d.	Survived	Dead	Day Died	No. Pigs	No. m.l.d.	Survived	Dead	Day Died
3	5	1	2	3rd	3	5	2	1	3rd
5	7.5	1	4	3rd 2nd	2	7.5	1	1	3rd
3	10	3	0		2	10	1	1	2nd
After 7 weeks					*After 7 weeks*				
1	10	0	1	3rd	2	15	1	1	3rd
2	15	1	1	3rd	—		—	—	
14 *Total*		6	8		9 *Total*		5	4	

Toxoid 892 Dose 0.5 c.c. 11.6 Antigenic Units per c.c. *Tested after 6 weeks*					Solution Toxoid Antitoxin Flocculi Dose 0.25 c.c. 22 Antigenic Units per c.c. *Tested after 6 weeks*				
No. Pigs	No. m.l.d.	Survived	Dead		No. Pigs	No. m.l.d.	Survived	Dead	
5	5	5	0		2	5	2	0	
2	7.5	2	0		1	10	1	0	
6	10	3	3	2 died	3	15	2	1	
4	15	4	0	septi-	3	20	0	3	
After 7 weeks				cemia					
1	30	1	0						
1	40	1	0						
19 *Total*		16	3		9 *Total*		5	4	

done by Reiner, all fractions; washings, dialyzate, residue and final product were tested by the author either directly or by blending with the crude toxoid by flocculation. As little as 1 antigenic unit can be detected after a prolonged time.

The present studies with guinea pigs are undertaken with a view to the following points: (1) The effect on immunity with a single dose of toxoids of different strength; (2) the same dose divided into 2 or 3 portions given 1 week apart; (3) the same divided dose given 3 weeks after the first injection and 2 weeks after the second injection; (4) the effect on immunization of a solution of toxoid-antitoxin flocculi; and

TABLE II

COMPARATIVE TESTS WITH TOXOID 901 WHEN GIVEN WITH ONE SINGLE DOSE OR SAME DOSE DIVIDED INTO 2 OR 3 DOSES. ALSO WHEN SAME DOSES ARE GIVEN 1 WEEK APART OR 3 AND 2 WEEKS APART

Toxoid 901 1 Dose 0.5 c.c. = 3.8 Antigenic Units

Tested after 6 weeks				*After 7 weeks*			
No. Pigs	No. m.l.d.	Lived	Dead	No. Pigs	No. m.l.d.	Lived	Dead
3	5	2	1	2	15	1	1
2	7.5	1	1				
2	10	1	1				

Toxoid 901—2 doses one week apart *Tested 6 weeks after 1st inoculation*					Toxoid 901—Given 3 weeks after 1st dose				
No. Pigs	No. m.l.d.	Lived	Dead		No. Pigs	No. m.l.d.	Lived	Dead	
2	10	2	0	Dose 1/4 c.c. 1/4	2	10	2	0	Dose 1/4 c.c. 1/4
2	15	2	0	c.c. Total 3.8	2	15	2	0	c.c. Tested 6
1	20	0	1	antigenic units.	2	20	2	0	weeks after 1st
1	40	0	1	Tested 6 weeks after 1st inoculation.	1	30	1	0	inoculation.
					1	35	0	1	
					1	40	1	0	
3	20	1	2	Dose 1/4 c.c. 1/8	3	20	2	1	Dose 1/4 c.c. 1/8
5	25	3	2	c.c. Total 2.9	2	25	0	2*	c.c. Tested 7
6	30	3	3	antigenic units.	5	30	3	2*	weeks after 1st
4	40	0	4	Tested 7 weeks after 1st inoculation.	5	40	3	2	inoculation.
24 Total		11	13		24 Total		16	8	

Toxoid 901—3 doses 1/4 c.c. 1/8 c.c. 1/8 c.c. Given 1 week apart. Total 3.8 antigenic units *Tested 7 weeks after 1st inoculation*					Toxoid 901—3 doses 1/4 c.c. 1/8 c.c. 1/8 c.c. given 3 weeks after 1st and 2 weeks after 2nd inoculation *Tested 7 weeks after 1st inoculation*				
No. Pigs	No. m.l.d.	Lived	Dead		No. Pigs	No. m.l.d.	Lived	Dead	
3	25	0	3		2	25	2	0	
4	30	1	3		4	30	3	1	
5	40	2	3		2	40	2	0	
2	50	0	2		3	50	3	0	
					4	60	2	2	
14 Total		3	11		15		12	3	

* One of each died of septecemia.

TABLE III

TOXOID 892—11.6 ANTIGENIC UNITS PER C.C.

One dose 1/2 c.c.—5.8 antigenic units

No. Pigs	No. m.l.d.	Survived	Dead	Day	
5	5	5	0		
2	7.5	2	0		
6	10	3	3	2nd	2 died septicemia
4	15	4	0		
	After 7 weeks				
1	30	1	0		
1	40	1	0		
19 Total		16	3		

Same 2 doses 1/4 c.c. 1/4 c.c. one week apart Total 5.8 antigenic units

No. Pigs	No. m.l.d.	Survived	Dead	Day	
2	10	1	1	2nd	Septicemia
2	20	2	0		
2	25	1	1	5th	Lungs septicemia
1	40	0	1	3rd	
7 Total		4	3		

Same 1/4 c.c. 1/4 c.c. 3 weeks after 1st inoculation

No. Pigs	No. m.l.d.	Survived	Dead	
2	15	2	0	Tested 6 weeks after 1st inoculation
2	20	2	0	
2	25	2	0	
1	30	1	0	
1	35	1	0	
2	40	2	0	
1	50	1	0	
11 Total		11	0	

Same 3 doses 1/4 c.c. 1/4 c.c. 1/8 c.c. one week apart Total 7.3 antigenic units

No. Pigs	No. m.l.d.	Survived	Dead	Day	
3	15	2	1		
3	20	3	0		
3	25	3	0		
1	40	0	1		
1	50	1	0		
1	60	1	0		
12 Total		10	2		

Same 3 doses 1/4 c.c. 1/4 c.c. 1/8 c.c. 3 weeks after 1st and 2 weeks after 2nd inoculation

No. Pigs	No. m.l.d.	Survived	Dead	
2	15	2	0	
2	20	2	0	
2	25	2	0	
1	40	1	0	
2	50	2	0	
1	60	1		
10 Total		10		

(5) the effect of toxoid purified by precipitation with alcohol (Reiner's Method).

The solution of toxoid-antitoxin flocculi was prepared according to

the method of Ramon, Legroux and Schoen.[8] This is a process of extracting antigen from the flocculated mixture of toxoid-antitoxin. The flocculated mixture was centrifuged, washed with physiological salt solution, again centrifuged, then dissolved in distilled water 4 times less than the original volume, and heated to 82° C. for 20 minutes.

The resulting concentrated and purified antigen (most of nitrogen is removed) is claimed by the authors to possess all the characteristics of a toxoid, namely, thermostability, irreversibility, specificity, flocculating and immunizing power, and presents dissociation phenomenons in the presence of an L o dose. As will be seen from the tables, the solution of flocculi gives quite good immunity in the guinea pig though not in proportion to its antigenic units as compared with the crude toxoid. But because it gives very little reaction in the adult human, it could be used in the proper dosage as an antigenic agent in selected cases. The toxoid purified by precipitation with alcohol, gives too severe reactions in the human to be considered in its present state as a substitute for the unconcentrated toxoid.

The accompanying tables are illustrative of the results on the points discussed. Table I shows that with an equal dose of different toxoids, the degree of immunization increases with the number of antigenic units per c.c. of the toxoid. Thus toxoid 892 containing 11.6 units is far superior to toxoids 901 and 903 containing 7.6 and 5.9 units respectively. Seven weeks after the injection the guinea pigs receiving ½ c.c. of toxoid 892 survived 30 and 40 m.l.d.'s while only some of those injected with the others survived 15 m.l.d.'s.

Table II shows that the same dose of 901 (7.6 antigenic units per c.c.) when given in 2 and 3 portions 1 week apart confers more immunity than the single dose of 0.5 c.c. or even less (0.25 or 0.125 c.c.). The degree of immunity is still more enhanced when the same divided doses are given 3 weeks after the first and 2 weeks after the second injection.

Table III demonstrates the same principle with the stronger toxoid 892 (11.6 antigenic units) though not to the same degree as the weaker.

Table IV illustrates the degree of immunity conferred by the solution of toxoid-antitoxin flocculi. Compared to the immunity conferred by toxoid 892, which was given in 5.8, 5.8 and 7.3, totalling 18.9 antigenic units, the solution of flocculi does not show up so well with 5.5, 8.3 and 11.0, totalling 24.8 antigenic units.

Table V shows some of the dissociation phenomenons of toxoid 892 (11.6 antigenic units per c.c.) and the solution of toxoid-antitoxin flocculi in different quantities in the presence of an L o dose. The results with the solution of toxoid flocculi would prove Ramon's con-

TABLE IV

SOLUTION TOXOID-ANTITOXIN FLOCCULI (WASHED, DISSOLVED IN DISTILLED WATER AND HEATED AT 82° C. 20 MINUTES)

22 ANTIGENIC UNITS PER C.C. BY FLOCCULATION

One dose 1/4 c.c.—5.5 antigenic units

No. Pigs	No. m.l.d.	Survived	Died	Day		
2	5	2	0			Tested 6 weeks after 1st inoculation
1	10	1	0			
3	15	2	1			
3	20	0	3	2nd	2 died of septicemia	

Two doses 1/4 c.c. and 1/8 c.c. given 3 weeks after 1st inoculation—Total 8.3 antigenic units

No. Pigs	No. m.l.d.	Survived	Died	Day		
2	5	2	0			Tested 7 weeks after 1st inoculation
1	25	1	0			
1	30	0	1	2nd		
3	40	3	0			
3	50	1	2	2nd	1 had solid lungs	

Three doses 1/4 c.c. 1/8 c.c. 1/8 c.c.—2nd dose 3 weeks after 1st, 3rd dose 2 weeks after 2nd—Total 11 antigenic units

No. Pigs	No. m.l.d.	Survived	Died	Day	
3	40	2	1	Next day	Septicemia
6	50	1	5	Next day	3 symptoms of septicemia
4	60	2	2	Next day	Peritoneal abscess in one. Second died 8th day

TABLE V

DISSOCIATION PHENOMENONS WHEN TOXOID AND SOLUTION OF TOXOID-ANTITOXIN FLOCCULI, RESPECTIVELY, ARE ADDED IN DIFFERENT QUANTITIES TO AN L o MIXTURE

Quantity of toxoid of 11.6 antigenic units per cubic centimeter added to the L o dose	Fate of guinea pigs injected with this mixture	Quantity of solution toxoid flocculi of 22 antigenic units per cubic centimeter added to the L o dose	Fate of guinea pigs injected with this mixture
L o dose—1 c.c.	Died in 3 days	L o dose—1/2 c.c.	Died in 3 days
1 c.c.	Died in 4 days	1/2 c.c.	Died in 7 days
1/2 c.c.	Died in 7 days	1/3 c.c.	Died in 3 days
1/2 c.c.	Died in 8 days	1/3 c.c.	Died in 8 days
1/30 c.c.	Died in 2 weeks	1/30 c.c.	Alive after 2 weeks
1/30 c.c.	Died in 2 weeks	1/30 c.c.	Alive after 2 weeks

tention that this preparation has all the characteristics of toxoid.

Unfortunately we had very bad luck with guinea pigs this year. Fully three-quarters of them died of septicemia before we had a chance to test them. Still as all the animals were subjected to the same conditions, the comparisons are pretty fair. In the dissociation phenomenons with toxoid and the solution of toxoid flocculi the death of the animal was rather delayed compared with the results given by Ramon. It was due probably to the fact that the L o dose was prepared with a fresh toxin and promptly flocculating antitoxin (25 minutes). When the toxoid and solution of toxoid flocculi, respectively, were added to the L o dose after standing 15 minutes a more stable union between the toxin and antitoxin might have taken place and a smaller quantity of toxin consequently liberated than when a slowly reacting antitoxin was employed. Ramon[7] mentions the same occurrence when he used a promptly flocculating antitoxin. These facts would prove Madsen and Schmidt's contention that a promptly flocculating antitoxin had a greater therapeutic effect than a slowly flocculating one. More work is in progress on this point.

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Cuba Honors Dr. Finlay

THE 98th Anniversary of the birth of the noted Cuban bacteriologist, Dr. Charles John Finlay, was celebrated by a ceremony under the auspices of the Department of Health of Havana on December 3. This took place in the open court of the Department's building, where a statue of Dr. Finlay was erected some years ago.

The Preparation of Stabilized Schick Toxin*

P. J. MOLONEY AND EDITH M. TAYLOR

Connaught Laboratories, University of Toronto, Toronto, Canada

HERETOFORE in carrying out the Schick test it has been necessary, on account of the instability of diphtheria toxin diluted with saline, to dilute the toxin just prior to the test. Apart from the inconvenience of this procedure, there is always the possibility of error, due either to inaccuracy in the measurement of small amounts of undiluted toxin or to improper technic in mixing the toxin and saline. Recently, however, certain diluents have been recommended the purpose of which is to increase the stability of the diluted toxin. Glenny, Pope and Waddington[1] showed that if borate buffered saline is used as diluent in place of the usual phenolized saline there is a marked improvement in the stability of the diluted product. Later Glenny and Waddington[2] found that the stability of the diluted toxin could be further increased by the addition of broth. Bunney[3] recommended as diluent a solution containing 2 per cent peptone, 0.8 per cent sodium chloride and 0.5 per cent phenol. His diluted toxins were entirely satisfactory from the point of view of stability. He pointed out, however, that with his stabilized toxin, reactions were in some cases more marked than was desirable. O'Brien[4] in a recent note stated that Glenny has found that borate buffered saline containing peptone 1–1,000 is a satisfactory diluent for Schick toxin. In a recently published paper[5] we have shown that diphtheria toxin diluted with saline containing borate buffer and gelatin is more stable with respect to toxicity than toxin diluted with saline containing only borate buffer.

In this paper we are reporting further results on the use of borate-gelatin-saline as a stabilizing agent for Schick toxin.

For the standardization and testing of Schick toxin we use the method which is set forth in the "British Therapeutic Substances Regulations," 1927, and also in the Canadian "Regulations under the Food and Drugs Act," 1928. By this method of standardization, Schick toxin must fulfil a toxicity requirement and an antitoxin combining requirement.

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* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

The following details, by which a test dose of Schick toxin is measured, are taken from the British Regulations.

1. Toxicity requirement: " By intracutaneous injection into normal guinea pigs, without admixture with antitoxin, 1/50 of 1 test dose must not cause, and 1/25 of 1 test dose must cause, a definite local reaction of the type known as the 'positive Schick reaction.' "

2. Antitoxin combining requirement: " By intracutaneous injection into normal guinea pigs in mixtures with different proportions of diphtheria antitoxin. One test dose mixed with 1/750 or more of a unit of antitoxin must cause no local reaction, but mixed with 1/1,250 or less of a unit of antitoxin must cause a definite local reaction of the type known as the ' positive Schick reaction.' "

Toxins which fulfil these requirements have a toxicity of about 1/50 m.l.d. per 0.1 c.c. From among 10 toxins containing 0.5 per cent phenol which had been stored for 2 years or more, 9 were found by these requirements to be suitable for the Schick test.

EFFECT OF VARIATIONS IN DILUENT

In Table I there is summarized the results of experiments on the effect of concentration of borate, concentration of gelatin and pH on the stability of Schick toxin. The toxin solutions used were prepared as follows: Two borate buffer solutions pH 7.9 and pH 8.5, made after the method of Sörensen, were each diluted 1–2 and 1–4 with distilled water and sodium chloride added to a concentration of 0.85 per cent. Four measured amounts of each of these 4 solutions were autoclaved, and after they had cooled, gelatin was added from a sterile 6 per cent solution in amounts to give for each concentration of borate 4 solutions containing respectively 0.08 per cent, 0.04 per cent, 0.02 per cent and 0.0 per cent of gelatin. Diphtheria toxin was then added to each of the 16 solutions in such amount that the final concentration fulfilled the Schick toxin requirements. The Schick toxins, prepared as above, were filled into nonsol vials and some of each of these we kept at 37° C., at room temperature, and in the cold room, until the tests were carried out.

The results recorded in Table I were obtained by diluting the Schick toxins 1/25 and injecting 0.1 c.c. of these dilutions intradermally into guinea pigs. The numbers represent the diameters in mm. of the resulting reactions after 48 hours.

Of the toxins which had been kept at 37° C. for 6 days, those without gelatin were atoxic at the 1/25 dilution, those containing gelatin at pH 8.5 showed a noticeable loss in toxicity, while those containing gelatin at pH 7.9 were not appreciably changed. Further within the limits tested the results showed that the toxicity of the solutions does

TABLE I

EFFECT OF DILUENT AND TEMPERATURE ON SCHICK TOXIN

Temperature	Time	1 to 4 Borate 0.85% NaCl pH 7.60–7.70				1 to 2 Borate 0.85% NaCl pH 7.80–7.95			
		0.08% gel.	0.04% gel.	0.02% gel.	0% gel.	0.08% gel.	0.04% gel.	0.02% gel.	0% gel.
		1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose
37° C.	6 days	14r	12r	13r	0	11r	11p	11r	0
20° C. (R.T.)	6 mos.	—	12r	12r	—	—	13p	13p	—
7° C.	6 mos.	—	14r	12r	—	—	12r	12r	—
	10 mos.	15r	15r	14r	—	12r	14r	12r	—

Temperature	Time	1 to 4 Borate 0.85% NaCl pH 8.45				1 to 2 Borate 0.85% NaCl pH 8.47			
		0.08% gel.	0.04% gel.	0.02% gel.	0% gel.	0.08% gel.	0.04% gel.	0.02% gel.	0% gel.
		1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose
37° C.	6 days	0	10p	5p	0	7 v.f.	0	8 v.f.	0
20° C. (R.T.)	6 mos.	—	11p	11p	—	—	15p	12p	—
7° C.	6 mos.	—	13r	14r	—	—	12r	12r	—
	10 mos.	14r	15r	12r	—	11r	16r	15r	—

v.f. = very faint
p = pink
r = red

not depend on the concentration of borate or the concentration of gelatin.

There was no noticeable alteration in those toxins which had been kept for 6 months at room temperature or for 10 months in the cold room (8° C.).

STABILITY OF DIFFERENT TOXINS DILUTED TO SCHICK TOXIN CONCENTRATION

Five different phenolized (0.5 per cent) toxins which had been stored for a period of 2 years or more were each diluted to the level of Schick toxin with borate-gelatin-saline (Sörensen's borate buffer pH 8.0 diluted 1–4, sodium chloride 0.85 per cent and gelatin 0.02 per cent). These, after having been filled into glass vials, were left at

37° C. for 4 days and then tested for toxicity. The results, given in Table II, indicate that all 5 toxins were stabilized equally well.

TABLE II

RELATIVE STABILITY OF DIFFERENT TOXINS AT 37° C. FOR 4 DAYS

Toxin	37° 1/25 Schick Dose	7° 1/25 Schick Dose
104	11r	14p
147	10p	11p
152	11p	12p
184	13r	13p

r = red
p = pink

EFFECT OF TRANSPORTATION

We owe the suggestion for carrying out an experiment on the effect of transportation on Schick toxin to the paper by Bunney.[8] A Schick toxin, made up as just described, was filled into hard and soft glass ampoules, some of which were sent by mail to various places and returned to us for testing. At no time during the shipping were the ampoules kept on ice. The results given in Table III are for the toxins contained in the soft glass ampoules. There was no significant difference due to the different types of glass.

TABLE III

INTRADERMAL TOXICITIES AFTER SHIPPING

	1/25 Schick Dose	1/5 Schick Dose
Icebox Control	12p	18r
China (Chuchow) and return	11p	16r
China (Kongmoon) and return	13p	18r
Spain and return	12p	18r
Nigeria and return	12p	18r
Java and return	11p	18r
Italy and return	12r	17r
Geneva and return	13r	21r

r = red
p = pink

NOTE: We wish to thank Mrs. Paul Geerling, Dr. W. B. Johnson, Dr. A. Moschini, Dr. Manuel G. Juarequi, Dr. W. B. McClure, Rev. William K. Amyot, Dr. J. G. FitzGerald for their kind coöperation in these experiments.

The toxins were in transport during the summer months—June, July and August. The table shows that they did not lose significantly in toxicity during shipping.

REACTIONS IN HUMANS

Table IV gives the results of Schick tests carried out on a group of adults aged 25–35 years. The materials used were Schick toxin

diluted with saline, Schick toxin diluted with borate-saline containing gelatin, Schick toxin diluted with saline and heated, and diluted toxoid. The numbers represent the average diameters in mm. of the reactions 7 days after the injections. There is substantial agreement between the results with the regular Schick toxin and the Schick toxin containing gelatin. The agreements in readings between the 2 toxins were equally good on the preceding days. In no test which we have carried out on humans using regular Schick toxin and Schick toxin containing gelatin has there been evidence of undesirable reaction due to the gelatin.

It is worthy of note that all Schick toxins are not equally suitable for the test. Certain ones give a higher percentage of interpretable readings than others. Of 2 Schick toxins, for example, which fulfil the toxicity and antitoxin combining requirements, one may be more suitable than the other because of the greater degree in which it exhibits a fading out of reaction in immune individuals who are sensitive to diphtheria protein or other protein contained in the Schick toxin.

TABLE IV

SEVENTH DAY READINGS OF SCHICK TESTS ON ADULTS

No. of Individuals	Antitoxin per c.c. Serum	Stabilized Schick Toxin	Schick Toxin	Heated Schick Toxin	Diluted Toxoid
13	> 1/25	0	0	0	0
1	< 1/100	16p	13p	0	0
1	< 1/100	23r	21r	0	0
1	< 1/100	19r	20r	0	0
1	< 1/100	19r	19r	0	0
1	< 1/100	14r	18r	0	0
1	< 1/100	19r	22r	0	0
1	< 1/100	14p	19r	0	0
1	< 1/100	20r	22r	0	0
1	< 1/100	23r	20r	0	0
1	< 1/100	19r	24r	0	0
1	< 1/100	20r	22r	8p	11p
1	< 1/100	15r	20p	3p	4p
1	< 1/100	16r	20r	11p	10p
1	< 1/100	21p	16r	10p	12p
1	< 1/100	22r	24r	5p	6p
1	> 1/25	9r	20r	12r	22r
1	> 1/25	7p	10p	5p	13p
1	> 1/25	11p	10p	15p	14p
1	> 1/25	16p	18p	14p	9p
1	> 1/25	12p	21p	15p	14p
1	> 1/25	14r	15p	14p	11r
1	> 1/25	16r	17p	16p	16r
1	> 1/25	8p	11p	11p	12p
1	> 1/25	10r	12r	10p	14r
1	> 1/25	5p	10p	10p	10p

CONCLUSIONS

Evidence is presented that a 1–4 dilution of Sörensen's borate buffer pH 8.0 containing sodium chloride 0.85 per cent and gelatin 0.02 per cent is a suitable diluent for the preparation of Schick toxin.

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Pellagra in the United States

AS early as 1864, Gray of New York, and Tyler of Massachusetts, each reported a case of pellagra. Sherwell of New York reported cases in 1882 and 1902. Harris of Georgia reported a case complicating hookworm disease in 1902. In 1912, Babcock, a pioneer student of pellagra in this country, from a study of the clinical records of the South Carolina State Hospital for the Insane, and from personal interviews and correspondence with practitioners, asylum authorities, and others concerned, reached the conclusion that the disease had been continuously present in South Carolina at least since 1828. He also presented information indicating that the same may be said of many other sections of the South. Searcy, the first to report pellagra in endemic form in this country, states that there had been cases present but unrecognized at the Mount Vernon (Alabama) asylum each year at least since 1901. From a superficial survey of the Peoria (Illinois) State Hospital following the diagnosis of the first case, Siler and Nichols found many cases present, and from their study of this institution they concluded that the disease had been present there without recognition for not less than four years prior to the time of their investigation. Interesting reports of the experiences of practitioners and institution officials with the disease before they knew its nature are frequently encountered in the early American literature on pellagra, and the disease in endemic form has been traced back by various observers in various sections to 1885 and beyond. . . .

The principal argument against the existence of pellagra in the South to any considerable extent prior to its general recognition in 1907–1908 is the fact that it was not so recognized. This position may appear reasonably sound when taken at face value; but there are many valid reasons why the most competent physician might have failed to recognize the disease. Few of the older American textbooks on medical subjects mention it. Such well known books as *Flint's Practice of Medicine*, published in 1866 and revised in 1880, *American Text Book of the Theory and Practice of Medicine* (1887), Musser's *Medical Diagnosis* (1896), and other standard works of that period make no reference to such a condition. In the first seven editions of Osler's *Principles and Practice of Medicine* the disease receives scant notice, the brief reference to it embodying the statement: " it has not been observed in the United States." In a later (eighth) edition of his work this author states that " it has probably been present in the South for 50 years."—*Pub. Health Rep.*, Sept. 18, 1931, pp. 2223 & 2226.

What Can a Community Do When It Is Not Yet Ready to Establish a Mental Hygiene Clinic?*

H. G. WEISKOTTEN, M. D.

Dean, College of Medicine, Syracuse University, Syracuse, N. Y.

TO ask one interested in medical education to introduce this subject and to ask one interested in nursing education to open the discussion might be interpreted as emphasizing the shortcomings of both medical and nursing education as far as mental hygiene is concerned. Were the medical and nursing profession even reasonably "mental hygiene conscious," the development of a community mental hygiene program would be greatly facilitated.

In view of the previous discussion and the many and varied factors involved, I will present the subject not at all from the theoretical or philosophical viewpoint but rather by reviewing briefly our experiences in Syracuse during the past 6 years. In September, 1925, the situation there was somewhat as follows:

There were no trained workers in family case work. There was no intelligent children's work; no intelligent child placing work. Probation work was very inadequate. Practically no genuine protective work was done. Cases were brought into court and summarily disposed of. No visiting teacher work was done. There were a part-time psychiatrist and a psychologist attached to the Board of Education, whose work, however, pertained to children referred for placement in ungraded classes.

In connection with our Free Dispensary we did have a 5-year old psychiatric clinic, which clinic received both children and adults. During the first 2 years there was neither a social worker nor any clerical help in connection with it. The psychiatrists in charge were busy practitioners serving on a part-time volunteer basis. Handicapped as they were, they were able to accomplish only a little of what we knew should be done and the clinic was failing in the fulness of its purpose

* Read at a Joint Session of the Child Hygiene and Public Health Nursing Sections of the American Public Health Association at the Sixteenth Annual Meeting at Montreal, Canada, September 14, 1931.

both in the eyes of those responsible for its conduct and of the general profession.

In November, 1922, at the suggestion of the psychiatrist in charge, the state was persuaded to coöperate in placing a competent psychiatric social worker in this clinic, which also served as a state parole clinic. The Onondaga Health Association paid part of the salary of this worker.

By 1925, sufficient interest had been aroused to warrant the formation of the Mental Hygiene Committee in the Onondaga Health Association. Key people in the community were persuaded to accept membership on it.

We had been extremely fortunate in securing an unusually competent worker in our dispensary clinic, and according to plan she immediately became Secretary of our Mental Hygiene Committee. She made frequent reports to the committee and there rapidly developed an enthusiastic interest in her work.

Eventually the committee, desiring to expand the scope of the program, carefully surveyed the entire local situation and decided that the most promising field for development was in the public schools. The City Department of Education signified its willingness to have the Secretary of our Mental Hygiene Committee serve as a visiting teacher in one of the schools. Considerable care was exercised in selecting the school in which this demonstration should be carried on.

The following year she was relieved of her psychiatric clinic responsibilities, this work being carried on by another competent worker brought to Syracuse by the committee.

At the same time the Board of Education appointed an additional psychiatric social worker to do visiting teacher work in another of the public schools. She was selected by the Mental Hygiene Committee and at first her salary was paid by the Milbank Memorial Fund as part of the Syracuse Health Demonstration. After the first year her salary was taken over by the city.

During this whole period, in addition to reporting frequently to the Mental Hygiene Committee, these workers carried on an educational program among the school teachers and with parent-teacher groups.

A number of public meetings, addressed by men with outstanding reputations, were held. The response was gratifying. To develop public interest and understanding, during the fall and winter of 1927 and 1928, a series of 8 mental hygiene lectures was arranged and a fee of $5 was charged for the course. Our attendance was something over 800 and the lectures netted sufficient funds to provide scholarships for summer courses for 6 local public health nurses and school teachers.

Later we ventured a 4-day institute involving 8 sessions within a period of 2 weeks, conducted by Dr. George K. Pratt of the National Committee on Mental Hygiene. The course tickets sold for $3 and the average attendance was about 300.

In September, 1929, a psychiatric supervising nurse was appointed in connection with the generalized nursing plan of the Bureau of Nursing of our City Health Department. This, I believe, was an innovation in municipal public health nursing. This supervisor's first activity was to give the nurses an understanding of mental hygiene and methods of approach. The mental hygiene program was integrated with every other activity of the nursing service instead of being developed as a separate entity.

For several years previous the Health Department had employed a part-time psychiatrist in connection with its preschool clinics. Here the psychiatric needs of the cases, including habit training, are met both by private consultation with the mothers and in habit training classes. The mental hygiene aspect of the preschool work has become very popular, so much so in fact that it is difficult to meet the demand for this type of service.

Other agencies were stimulated by the development of our program, and in April, 1929, following a study of the local situation by Dr. C. C. Carstens, the Children's Bureau (formerly The Society for the Prevention of Cruelty to Children), was completely reorganized. A competent director and trained social case workers were brought to Syracuse and that agency is now rendering a real, high type service.

In September, 1930, 2 additional visiting teachers were appointed by the Board of Education, which is now apparently prepared to develop this work as rapidly as practicable.

During this whole period there has gradually developed throughout the community a real demand for trained social case workers with a knowledge of mental hygiene. The Community Chest and the city administration have within the past few months sponsored a study of the entire local situation by the Family Welfare Association of America. We are looking forward to a series of really worthwhile developments as a result of this study.

Early in the development of our program there was evidenced an interest on the part of several groups in the establishment of a high grade child guidance clinic in Syracuse. A special committee of the Mental Hygiene Committee was appointed to consider the matter. The state was building a psychopathic hospital as one of the units of the University Medical Center and there was much discussion in regard to the advisability of this institution, or one of the other units of

the center, assuming responsibility for such a clinic. There was also much uncertainty in regard to how far the development of the Department of Education mental hygiene program would extend. These uncertainties with the relatively great financial outlay involved in the establishment and maintenance of such a clinic have led us to defer action in regard to it. There were also those of us who were still uncertain as to whether child guidance work should be developed by psychiatrists or by psychiatrically trained pediatricians.

With the opening of the State Psychopathic Hospital in January, 1931, the psychiatric clinic was transferred from the dispensary to the new institution. Although children have been admitted to both the out-patient department and the hospital proper no effort has been made to develop a child guidance clinic.

During the past year the school psychiatrist has been placed on a half-time basis and maintains regular hours for conference and consultation with visiting teachers and for the study of problem cases.

Although we clearly see our need for high grade child guidance facilities, our future development will depend upon finances and personnel available. As I suggested earlier, there is much uncertainty in the minds of many of us in regard to the most wholesome development in this whole field. It is entirely possible that, because of the extent of the field and the relatively great expense involved in what we now consider an ideal program, an entirely new approach may be sought.

The development of a mental hygiene viewpoint on the part of the medical and nursing professions will surely permit a much more coordinated program than is now possible. I believe that both medical and nursing educators are awakening to their responsibilities in this direction.

Although I have necessarily omitted many details, I hope that I have given you some idea as to what has seemed to us the soundest type of development of a mental hygiene program under the conditions existing in Syracuse.

RECOMMENDATIONS

On the basis of this experience, I would be inclined to leave with you the following suggestions:

The development of a mental hygiene program should be placed in the hands of an agency which assumes community leadership and has very definite community force.

This agency may operate within its own field or by coöperation within the field of some other agency either official or unofficial. It can best operate in that field which has great need for development and at the same time offers a setting which promises most easily demonstrable results.

The scope of the work undertaken must be sufficiently limited to guarantee that it will be well done.

No demonstration work should be undertaken except by adequately trained workers. However, this does not mean that all of the adequately trained personnel required for a complete program must be available from the start. A real demand for these may be developed only as the program progresses.

Have frequent reports made by the workers to the agency members. In this way you will develop an interested forceful nucleus.

Carry on a steady educational program as the various groups in the community are ready for it.

Gradually extend the scope of the work, being sure not to lower standards by too rapid expansion or bringing in or tolerating incompetent workers.

Make every effort to carry along the other agencies in the development.

I believe that much of the preliminary program can be carried on even in the absence of an adequately trained psychiatrist. The development of the program will usually create a demand for such an individual.

Just as the development of our child health program created a demand for an increased number of pediatricians throughout the country, so the development of our mental hygiene program will create a like demand for adequately trained personnel. Once established, this demand will just as surely be met.

Marketing Mass Education*

HOMER N. CALVER, F. A. P. H. A., AND BERTRAND BROWN

Assistant Professor of Hygiene, Bellevue and University Medical College, New York University; and Director of the Division of Publication of the Milbank Memorial Fund, New York, N. Y.

MANY discussions pertaining to health education lead early in their course to confusion of thought because the phase of the subject discussed is not made clear at the outset. To avoid this difficulty the Public Health Education Section of the American Public Health Association several years ago, proposed a terminology for common use. Phraseology was then recommended to define three types of public health educational activity:

1. The formal academic instruction given to students of health was designated as "public health training." (Two different types of training are actually embraced under the terminology "public health training." On the one hand it includes the curricular courses designed for those who are studying to equip themselves as public health workers of one type or another, i.e., public health nurses, engineers, epi-

* Read before the Public Health Education Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

demiologists, etc.; and on the other hand, it includes the incidental training in hygiene or public health given to those who may later become auxiliary aids in the public health campaign, for example, teachers, social workers, and physicians.)

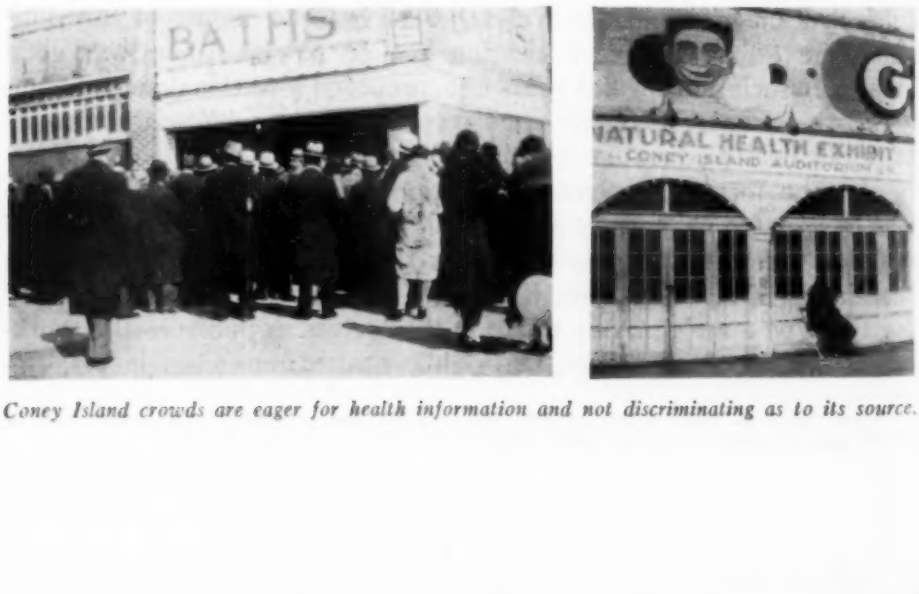
2. The training of children in the school and elsewhere in health habits and the principles of hygiene and public health was designated as "child health education," and this term has become well established.

3. The less formal activities directed to the education of the adult population were designated "popular health instruction," phraseology which has not been widely accepted. The implication here that you cannot educate the mass but only instruct it suggests defeat at the outset.

The subject of this paper cuts somewhat across all three of these distinctive lines of endeavor. In the main, however, it concerns adult health education and child health education outside the classroom. Because neither of the fields indicated, singly or together, serve to emphasize the extent of the problem here in mind (its scope and the methods it necessitates being far beyond those commonly visualized) we have borrowed from contemporary popular educators in China the term "mass education."

By "mass education in health," is meant the dissemination among the whole population of knowledge gained by the technical worker in the field and laboratory to the end that this knowledge may be applied individually and collectively for the prevention of disease, the postponement of death, and the building up of a vigorously healthy population.

Failure to discriminate between the terms "hygiene" and "public health" also results in confusion at times. The one concerns the indi-



Coney Island crowds are eager for health information and not discriminating as to its source.

vidual and his personal acts. The other concerns the individual only as a unit of society and his part in the collective acts of the group. Mass health education is concerned with both hygiene and public health and needs to distinguish between them in formulating its programs.

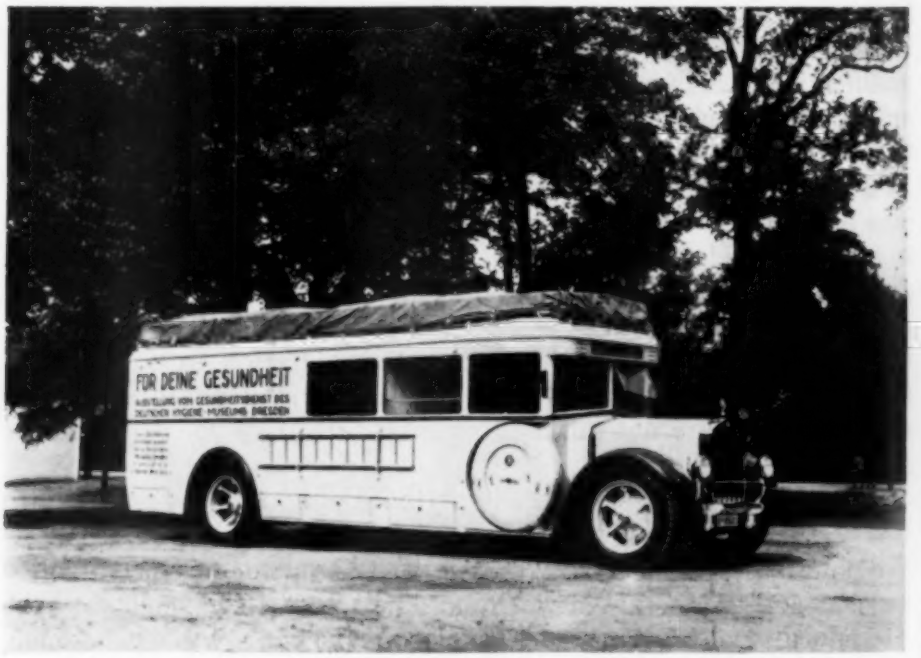
It is not necessary perhaps here to dwell on the importance of public health education. But there have been times in these counsels when the importance of adult education has been allowed to become obscured by emphasis on child health education. Adult education has been considered, when at all, chiefly as instruction in personal hygiene temporarily necessary to correct earlier deficiencies in child health education. Some would have us believe that if we could only thoroughly train one generation of children the necessity for adult health education would thereupon cease. The child is father to the man but the man is also father to the child. And this relationship has significant implications for health educators. In a diphtheria immunization campaign or in such instances as the recent epidemic of infantile paralysis, prevention depends on adult understanding. In many instances, adult education provides society with its only opportunity for reaching the child.

Our whole program of child education is dependent upon a certain amount of adult education, at the very least an amount sufficient to approve appropriations for teachers' salaries. Much educational effort with children is nullified by adult example. Indeed it is often nullified by the example of the teacher herself. It is doubtful if such nullification would be eliminated by offering adequate health education in their youth to future adults, parents and teachers.

How much of the content of one's early training is really carried into adult life? If the principles of health taught in childhood are to maintain their brilliant reality through all the amazing experiences and expanded horizons of adult life, the education of the individual must be everlastingly kept at, through grade school, high school, college, and mature adult life. What Bruce Barton says of advertising is equally true here: "You can't advertise today and quit tomorrow. You are not talking to a mass meeting—you're talking to a parade."

Even though we accept the importance of continuous mass education we have but rude implements with which to perform our tasks. We pour our time and money into posters, pamphlets, lectures, motion pictures and the radio, but we do not know very much about the relative educational value of these technics. Who can say in what circumstance a radio talk is more effective and economical than a motion pic-

Spacious corridors, colorful designs and artistic presentation of information on hygiene attract many visitors



The traveling health museum is independent and self-contained. It carries an exhibition tent on its roof and facilities for displaying a complete hygiene exhibit including motion pictures.

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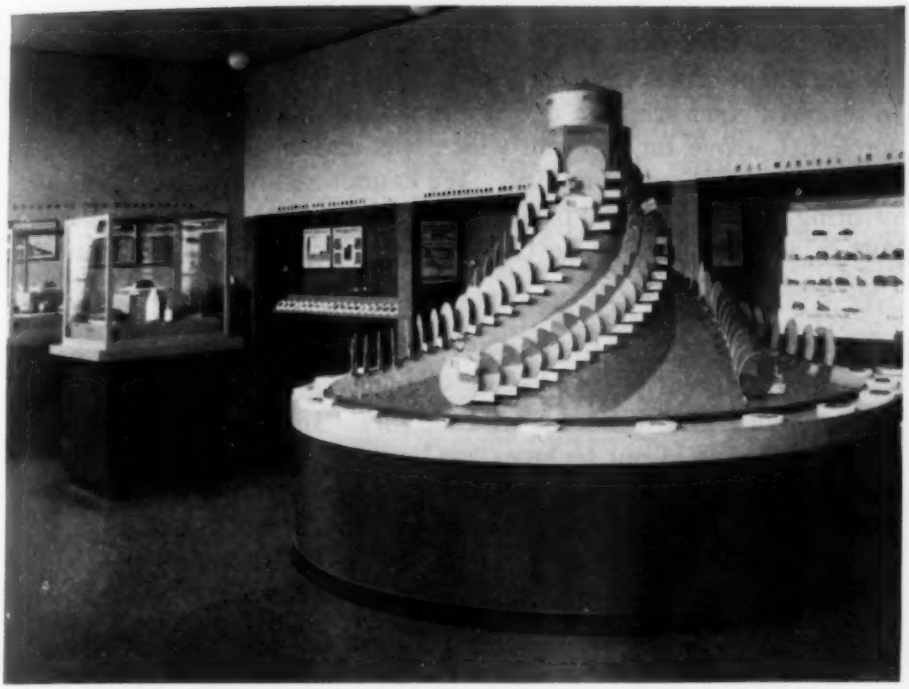


Carefully planned dynamic exhibits invite study and compel attention.

Permanent displays of three dimensional models at the German Hygiene Museum provide an open textbook on hygiene.

ture or when a poster will get better results than a pamphlet? Our measurement of the effectiveness of printed matter has too often been in terms of good printing, not in terms of life saving. This is as if the serologist strove for a serum which was crystal clear rather than for one which produced immunity. We cannot assume that because good printing pleases us it will please the public, or that if pleasing it will result in action. It may be that poor printing would save more lives than good printing.

Who can prove that his established use of any cherished medium has value in terms of life saving? What have we to show that the general health of a group exposed to prolonged health educational ministrations is any better off therefor? In our scant attempts to prove the value of our technics, we have been content with subjective standards.

Largely because they have proceeded empirically, health educators are tolerated as step children in the family of public health scientists. The laboratory man and the health officer have shown that toxin-antitoxin prevents diphtheria. The engineer has reliable statistical evidence that protection of a water supply decreases the incidence of typhoid fever. The public health nurse, the statistician, and the epidemiologist can produce convincing proof of the life saving value of their efforts. If mass education in health is to assume its legitimate place as a valuable routine in the public health campaign, equal in rank to vital statistics, bacteriology, or administration, the value of its methods must be proved, and newer and more effective methods found. It may be no more difficult to establish scientifically the value of our educational technics than it was to establish the value of present-day routines of communicable disease control. Those routines now appear to have been so easily proved, only because they have *been* proved.

The stern discipline of the laboratory and the brilliance of its results have attracted millions of dollars for research. As a result we have, compared with the past, a tremendous store of knowledge in preventive medicine. This is a store in the warehouse sense in that for the most part this knowledge is stored away in textbooks and journals, hidden from the layman among incomprehensible words and symbols and disguised with appalling statistics. Yet the research worker has performed his task. He has found the knowledge he sought. We have failed to make this knowledge available for the service of mankind. Production of knowledge has far outstripped consumption.

It is frequently argued that mass education in health cannot be

effected because the public is not interested in health. This argument is fallacious. It is an alibi undoubtedly often used when salesmen first tried to introduce the "horseless carriage." But the science of public health is not in the "horseless carriage" stage. There is abundant evidence of a ready market for health. Last March we visited the boardwalk at Coney Island. In spite of bristling weather, we found crowds gathered to listen to so-called health lectures by modern medicine men. These spell-binders are known as pitchmen. They sell books, rubber exercisers, psylla seeds, ointments, tonics and whatnot. They appreciate the dollar and cents value of the health appeal and the visual method. They constitute a clearly defined group on the edge of the entertainment profession. The health appeal has been seized upon also by producers and distributors of all types of articles in selling their wares. Automobiles, soap, refrigerators, underwear, toys, books and, of course, all sorts of foods are urged upon us for their health value. That the health motif has such universal commercial importance would indicate sufficient popular interest to insure success in any mass movement in health education, if the proper technics were used.

Hope for the future lies in our emergence from the empirical stage. With the help of our scientific confreres, we must test by objective standards our long established practices. But while undergoing such self-analysis, and perchance resultant housecleaning, we cannot profitably sit idly watching the parade go by. The problem of mass health education here outlined calls for the inauguration of methods adequate to the new concept which has already been caught by commercial interests.

That mass education, conceived in the broadest possible terms, is necessary to secure the utilization by individuals and communities of available demonstrated health knowledge, which, applied, would lengthen life and make it happier, this group does not need to be persuaded. Any methods, new or old, which will help to raise the health intelligence of the masses, this group will welcome. Proponents of visual methods of health instruction believe that wider use in America of the museum method, its value in other fields long since well established, will be a means of reaching thousands of individuals who are now indifferent to other appeals.

The museum of hygiene has demonstrated its success in Germany and elsewhere. As a museum it is not merely a repository of historical objects and data but a true educational institution. It is fundamentally a permanent exhibition of devices cleverly arranged to command interest and crystallize understanding. Such an institution

would draw its elements from many sources. It would be equipped with workshops, research laboratories, lecture rooms, a library, broadcasting studio and auditorium, in addition to spacious exhibition halls. It would serve as a center for research, experimentation and demonstration in visual and other unexplored methods for disseminating health knowledge.

There is probably no better existing model for such an institution than the Deutsches Hygiene Museum in Dresden. A museum like that in Dresden, adapted to American needs and medical standards, would be an important adjunct in spreading health knowledge among the masses, as well as in offering health education in elementary and secondary schools. It would also be a valuable aid in teaching hygiene in schools of medicine. For industry, as well, such visual instruction as only a museum could provide would be of inestimable benefit in instructing workers in accident prevention and health preservation.

A suitable building for such a museum would have ample proportions, easy accessibility, and possibilities for future enlargement. Among the exhibits would be wax, glass, and plaster models, charts, and posters. They would visualize all health problems related to the more common diseases in a manner so graphic and dramatic as to command the attention of the average layman and be readily understood by him. They would provide instruction on the structure and functions of the various parts of the body. They would illustrate such subjects as biology, personal hygiene, mental hygiene, care of the teeth, nutrition, prenatal, postnatal, and child care, communicable disease control, tuberculosis, venereal diseases, tropical diseases, hygiene of work and the protection of the worker.

The Deutsches Hygiene Museum began its existence in 1911 in connection with the first International Hygiene Exhibition. In 1930, the opening of a new and spacious permanent building for the Museum served as an occasion for holding in Dresden the second International Hygiene Exhibition, an event which was repeated in the summer of 1931. The permanent exhibits which this new building houses are the last word in visual health instruction. The charts, specimens, models and apparatus used are striking in design and compelling in interest.

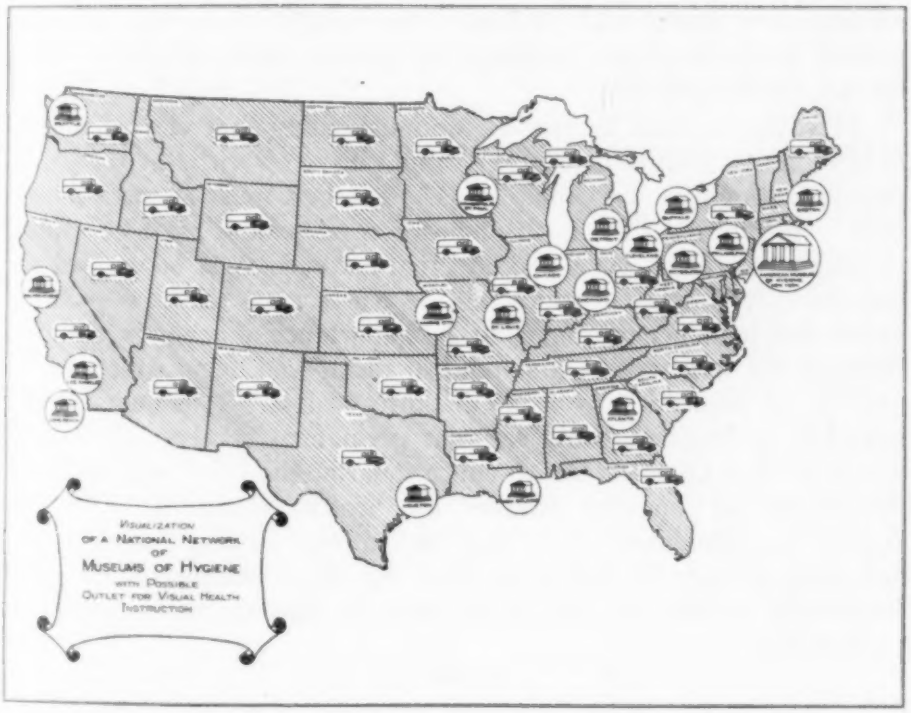
A unique feature of many of the displays is their movability, that is, many models are so arranged that the museum visitor may operate them by turning a crank, pushing a lever or touching a button. This not only excites curiosity but compels attention and probably assures that the lesson of these particular displays at least will be remembered.

These devices are most valuable also in attracting visitors to the museum.

A determined and highly successful effort has been made to keep all descriptive texts in the simplest language. The deadly seriousness which so often marks the effort to portray scientific information is absent to a large extent. Indeed many of the charts and legends are quite droll, and this effect has been achieved without sacrifice of professional standards.

The German museum probably goes further than public health workers in America would find it judicious to go in its emphasis on physiology and personal hygiene at the expense of community hygiene. It has, however, successfully maintained a balance between the various special hygienes. Such an exhibit gives to the man in the street a means of separating the true from the false and differentiating between the important and the trivial in the health propaganda to which he is subjected today from a variety of special interests.

Such a museum established in a large city in America might well become the headquarters for an extensive educational program comprising both intramural and extramural activities. Among the intra-



The concept of a national network of museums serving to disseminate health knowledge among the masses is inspiring to contemplate.

mural activities there would be lectures based on exhibits; radio broadcasts as dramatic in their way as the exhibits themselves; specially prepared exhibits on subjects of timely interest, such as influenza and infantile paralysis; and regular courses in hygiene and health education in coöperation with local schools and universities.

If the full value of the museum were to be realized, however, its activities could not be confined to its own building, or its home community. It would, for example, develop small portable loan exhibits for which there is an ever-present demand. Official and voluntary public health agencies have now neither the funds nor adequate experience in exhibit technic to provide sufficient valuable material of this type. Traveling exhibits such as the motorized exhibits of the German museum might well be utilized. In coöperation with state health departments, a number of which are already utilizing traveling exhibits, this would provide an admirable method of reaching rural populations. In time these temporary exhibitions might stimulate the development of a number of permanent museums, locally financed.

The question of financing such developments is one that we do not propose to raise here. Support has been forthcoming in the past for worthwhile projects. And if professional health educators in America earnestly desire such institutes for health education, and adequately voice that desire, undoubtedly support for them may be had in the not too distant future.

If we are to reach the masses, we must enlarge our view of the size of the job that confronts us. We cannot leave off with any temporary popularization of a few simple ideas. The task must be institutionalized. All phases of the health education movement must be utilized in concerted effort. New and effectual methods must be devised and continuously utilized in educating the whole mass of the population, generation upon generation, as to the importance of achieving, and the methods for achieving that summit of racial well-being which the researches of pioneers have made distantly visible. It is believed that museums of hygiene would serve as permanent centers for research and experimentation in health educational method and as a continual inspiration to reference sources for health educators. The concept of a national network of such institutions, serving in concert as a far flung, permanent and living force for the dissemination of health knowledge among the masses, is noble in purpose and inspiring to contemplate.

REFERENCE

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Health Aims and Professional Services Infancy, Preschool and School Ages*

Medium City

W. W. BAUER, M. D., F. A. P. H. A.

Commissioner of Health, Racine, Wis.

THE health of the child has been recognized as the most favorable point of attack in initiating a community health program. Scientifically, this choice is sound because we all recognize that not much is to be expected of efforts directed toward the health of generations which have reached adult life, while, on the other hand, the child is plastic. Moreover, if we are successful with the child of today, we have accomplished something for the adult of tomorrow and may reasonably expect that when our failing hands relinquish their activity we may find others who can carry on as well as we have—or better.

In attacking the question of child health in a medium sized city, we must first consider what the needs of the community are. What is its infant mortality? What are the component elements of the infant mortality—are the infant deaths occurring in the first few days of life, in the first month, or during the last 11 months of the first year? What are the leading causes of infant deaths? prematurity, diarrheal diseases, or respiratory diseases? What is already being done in the community with respect to the health of its children? Is there a safe water supply? Is pasteurized milk from tuberculin tested cattle available? Is the board or department of health functioning in child health work? If not, have there arisen voluntary groups to meet the need? If there are already workers in the field are they working toward the proper objectives as shown by the needs, or are they merely going through a routine copied from other communities? These, it seems to me, are questions which must be answered satisfactorily before we can proceed to discuss what the child health service of a given organization shall be.

It has always been fairly easy to establish child health programs in a community because of the sympathy for children, and especially for

* Read at a Round Table of the Child Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

babies, which is so easily aroused by appeals to the emotions. Unfortunately, while the response is usually generous it is not always wise. Too often it takes a form which at the outset seriously handicaps future progress of the work. Altogether too frequently child health programs, initiated either by voluntary or official organizations, fail to take the medical profession into their confidence and thus antagonize the physicians in the beginning. It is a much more difficult and time consuming task to overcome an established antipathy than it would have been to proceed from the beginning without creating needless antagonism.

The first question that is put before us is whether the public health aims and services of infancy, preschool and school health programs should provide medical and nursing service for sick children or for well children only. I wish to answer that question categorically in the negative as far as sick children are concerned. In my judgment, the community has a very definite responsibility for the dissemination of health information, and I believe that the demonstration method is the only one which will ever produce worthwhile results.

For well children there should be free facilities provided by the community, which should by actual demonstration teach the mother the proper care and handling of a new baby. This means clinics for physical examinations plus nursing service with demonstrations of bathing, formula preparation, clothing the baby, and advice as to exercise, sleep, sunshine, fresh air and routine of life. Such a service should be free to all, regardless of their economic status, because we know that it is not alone the poor and the unfortunate who are lacking in health information concerning their children.

On the other hand, the sick child is placed by the very fact of its illness outside the pale of preventive medicine. I recognize that there are border-line cases in which doubt may well arise as to classification, but most of these belong in the hands of the family physician or of the medical service provided by the community for the indigent sick. In my judgment, this latter should be definitely differentiated from the preventive service offered by the community.

I am definitely opposed to state medicine. I believe, and I think an overwhelming majority of the medical profession of this country believe with me, that the relationship between the doctor and the patient is a delicate, highly personal one which cannot and ought never to be standardized. When the community steps between the patient and the doctor, and the doctor becomes a paid servant of the state, both patient and doctor lose that indefinable relationship which has set the practice of medicine on a plane apart from all the other learned

professions. Therefore, for the community to provide medical service for the sick, unless they be indigent, is certain to lower the quality of medical service which the patients will receive.

We have but to look about us to see how difficult it is to get the more able and successful of our citizens to enter public life. They know from observation that a public servant is the target for unjust, frequently unreasonable, sometimes libelous, and almost always destructive, criticism. It is only the man with an extraordinarily placid disposition, or whose enthusiasm for the cause enables him to brush aside the irritations of public life, who can long survive in public office. If this is true of non-professional men, how much more forcefully does it apply to the doctor!

The doctor has always been an individualist, and I hope and trust that he will always remain so, though perhaps with a somewhat improved capacity for coöperation. The greatest leaders and teachers in medicine have repeatedly admonished their students that it is the patient who must be treated and not the case. If the community provides medical service for the sick, it must do so upon a mass basis; otherwise the cost becomes prohibitive. Preventive measures may be applied collectively, but sick people cannot be treated *en masse;* they demand, and are entitled to receive individual consideration.

Therefore for the infant, the preschool child, and the school child—and may I add the expectant mother—we may and should, through the community, provide health information and preventive service, but we must not mix our preventive program with community relief lest we unwittingly destroy both. Public health nursing has long held this as a basic tenet in its code of ethics.

The second question placed before us is whether the service for well children should be limited to education of parents, or is it the responsibility of the community to provide advisory medical service to safeguard the health of the children? It seems to me that our objective should be the education of parents and that our service should be limited to that objective. By education of parents I do not mean that we shall confine ourselves to the everyday educational weapons now commonly employed by health departments, such as pamphlets, indoor and outdoor posters, radio talks, group addresses, classes for mothers and little mothers, and exhibits. These means should be employed but there should also be education by demonstration. That means clinics at which well babies should be examined and at which the mothers can have demonstrated to them the condition and health of their babies; and that preschool children and school children should have physical examinations provided by the community.

I think, on the other hand, we have too often followed the line of least resistance. I recall very well the establishment of a child health center in a certain community. It was established by a voluntary agency, though the same error which I am about to elucidate might just as well have been committed by an official agency. In short, there was a section of this city populated largely by people of good education and economic status somewhat above the average. Many of them were college graduates; all had at least a high school education; and all were intelligent and progressive. They organized, and requested the establishment of a child health center in their neighborhood.

When the health officer was consulted, he pointed out to the committee that with funds available for only one more center, it was better to open it in a locality where the need was greatest. He was met with the argument that in the location he suggested there was no demand for the service. He attempted to point out that the very existence of a demand where they proposed to establish the station was evidence that the need for education in child health was less in that locality than in the other where no demand existed.

He made a spot map for them of infant deaths over a 5-year period and showed them that it was decidedly clean where they proposed to establish health service for babies and very markedly spotted in the other locality. He was overruled and has since on a number of occasions been shown the remarkable records of attendance at the baby clinic which was established in response to this vocal demand.

This instance seems to furnish the answer to a number of questions which I asked in opening this paper. Obviously much more good could have been done by opening a baby clinic in the center of a locality populated largely by laboring people of foreign descent and tackling the hard and much less attractive problem of awakening these people to a need which they did not even suspect.

I am a firm believer in the clinic method of objective demonstrations, and I think it should be open to all to teach the mothers what they ought to know about the health of their children. Nevertheless a mother who has 6 or 7 babies perhaps in as many years should not be encouraged to bring them, one after another, to a child health clinic, unless she is of low mentality, and is unable to learn from experience. I think that when her first baby has had the advantages of advisory service, she should not be allowed to shift her responsibility to the community as subsequent babies arrive, except perhaps to bring a new baby once or twice to refresh her mind. Should there not be graduation from health education as well as from other kinds? Should the

mother not be expected to learn, after a reasonable time, to go to her family doctor for well baby supervision? I am assuming that the family is able to pay for supervisory health service. If unable to pay, then of course the community owes it to her and to her baby to give her service indefinitely.

Let me not be misunderstood when I refer to the launching of public health projects without the coöperation of the medical profession. I am not making any plea for toleration of reactionary physicians who obstruct all progress and who oppose public health projects because of the mistaken idea that the economic effect upon the medical profession will be bad. We know that in the larger view, educational activities in the public health field, even when they render a considerable measure of advisory service, react to the benefit of the physicians. I believe that the more farsighted of the medical profession fully agree in this opinion. What I do want to emphasize is that public health is and must be based on the medical sciences. It is true that public health objectives are strongly tinged with social and economic aspects, but basically they are medical. It seems but logical that the medical profession should have a large measure of consideration in their inception and development, not for the sake of the medical profession, but for the benefit of the public health.

I am perfectly aware that organized medicine has not always assumed the leadership in the field of public health which might logically be expected of it, though it was doctors who first demanded health departments in many communities. It is, no doubt, partly the fault of the medical profession that the situation exists as it does, and yet we in the public health field are by no means blameless. Too often we evolve a full blown and—to us, at least—very beautiful project and seek the endorsement of the medical profession without ever having consulted them during the process of development and preliminary discussion. Being but human, they are resentful and we sacrifice cooperation which ought to be ours, and without which we can ill afford to proceed.

When the medical profession has been given due opportunity to participate and coöperate in public health work and has declined, rejected, or attempted so to hamper the work with restrictions that it becomes meaningless and futile, then obviously there is nothing to do but proceed to meet the community need, regretting the lack of participation by organized medicine.

Finally, in supporting my opinion that public health work should be limited to education and demonstration and should not attempt to supplant the family physician, I wish to cite the growing tendency in

this country toward paternalism in government. This tendency has been attacked often enough of late, and yet it proceeds apace. There is a growing feeling on the part of our citizens that they can and should thrust all their responsibility upon their government. A man buys a dog for a pet; the dog becomes mad; his owner calls upon the city to come and get the dog and either care for him or destroy him. Why should the community relieve him of a responsibility which he created? A small child playing alone on the street is the victim of an accident and the neighbors and friends proceed to condemn the community government because there was not a policeman on that spot at that moment to prevent the tragedy. Where were the parents? and why was not this child better guarded by them? An economic depression unbalances the wheels of industrial progress and a clamor arises for government to wave a magic wand and right matters overnight. Cannot business and industry stand on their own feet? Such examples could be multiplied without end.

Our nation was built upon individual initiative; today there is grave danger that in taking away from the individual too much of his responsibility we are going to destroy his resourcefulness, his self-reliance and his independence.

For those reasons which I have here imperfectly outlined to you, I believe that public health projects in the infant, preschool and school fields—and in others not here under discussion—should have education for their objective more and more, and service less and less.

Premiums to Mothers, Liége, Belgium

TO overcome the indifference of women to prenatal work and to infant health work, the municipal council of Liége, on July 1, 1931, offered premiums of 200 francs each to expectant mothers who attended regularly a prenatal health center or were examined by their own physician at least once before the end of the 6th month of pregnancy and not less than 3 times during the entire pregnancy, and who have had their infants regularly examined either at a health center or by the family physician. The premium is paid 3 months after the birth of the child.—*Oeuvre Nationale de l'Enfance, Revue Mensuelle,* Brussels, July, 1931, p. 776.

Public Health Service Hospitals Now Maintained at 155 Ports

APPROXIMATELY 500,000 persons apply yearly for care, treatment and physical examination at hospitals and other relief stations which the U. S. Public Health Service maintains at 155 ports of this country and its possessions.

Practically every class of disease is found among these patients. In the care and treatment of them, valuable scientific knowledge constantly is gained.

In the 25 marine hospitals operated by the Service more than 300 doctors and dentists, over 400 nurses, aides, and dietitians, and approximately 1,800 other persons are constantly employed in the care of a daily average of about 4,000 patients. The annual expenditures in the marine hospitals and other relief stations are more than $5,000,000. The marine hospitals are all general medical and surgical hospitals except the hospital at Carville, La. (National Home for Lepers), which is devoted to lepers, and the hospital at Fort Stanton, N. Mex., to which are transferred merchant seamen and other beneficiaries with tuberculosis, suitable for treatment in a high altitude.

The Marine Hospital at Ellis Island, while primarily designed for detained immigrants, is also used for regular service beneficiaries, and all the marine hospitals admit patients of the Veterans' Bureau when facilities permit. New marine hospitals have recently been completed at Detroit and Cleveland, others are in process of construction at San Francisco (500 beds), Galveston, and New Orleans (600 beds), and new marine hospitals have been authorized in New York (600 beds), Baltimore, and Seattle. The building program is necessary to keep pace with the development of the American merchant marine and to fulfil other obligations of the government to provide hospital treatment.

Those who now are entitled to the medical care and treatment from the Service are as follows:

1. American seamen employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States.
2. Officers and enlisted men of the Coast Guard.
3. Officers and seamen on vessels of the Coast and Geodetic Survey.
4. Officers and crews of vessels and certain keepers and assistant keepers of the Lighthouse Service.
5. Officers and crews of vessels of the Bureau of Fisheries.
6. Immigrants detained at immigration stations.
7. Seamen from vessels of the Army Engineer Corps and other vessels belonging to the United States Army.
8. Seamen employed on vessels of the Mississippi River Commission.
9. Beneficiaries of the United States Employes' Compensation Commission.
10. Patients of the Veterans' Bureau.
11. Lepers.
12. Officers of the Public Health Service and employes on field duty.
13. Prisoners at United States penal and correctional institutions.
14. Patients at Federal Narcotic Farms.

EDITORIAL SECTION

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REGISTRATION FEES AT ANNUAL MEETINGS

FOR the first time in the history of the American Public Health Association, the registration fee plan was established at the Sixtieth Annual Meeting in Montreal. Previously, it had been the custom to levy a tax of $1.00 upon non-members of the Association registering at the annual meeting. This year, members and non-members alike were asked to pay a fee of $2.00 when they registered. This innovation caused some discussion and a few protests. The Committee on Meetings and Publications, upon whose recommendation the plan was approved by the Executive Board, has been requested to explain to the membership why the recommendation was made and why the practice will be continued at the Washington meeting in 1932.

Like many organizations, the American Public Health Association has had difficulty in financing its annual conventions. Until the Committee on Meetings and Publications assumed the responsibility for the conduct and management of meetings, the annual meeting was expected to be a source of revenue for the Association. Not only was the city entertaining the Association called upon to provide entertainment for the visiting delegates, but it was also expected to raise sufficient funds to turn in to the Association treasury a considerable balance after all local expenses had been met. The success of an Annual Meeting came to be measured largely by its financial return, and the

meeting went to the highest bidder. This system placed an undue burden upon the health workers in the convention city. Money-raising became a bug-bear, and many communities that desired the meeting naturally showed hesitation in issuing invitations because of the financial responsibility involved.

The committee faced this situation frankly and determined to change it. It was decided that in future no financial guarantee from any city will be required. The expenses of the executive office will be financed as far as possible from the sale of exhibit space. The local committee in the convention city will be asked to provide entertainment only, and that entertainment may be as simple or as elaborate as the local committee determines.

The term "entertainment," as used here, must not be interpreted as meaning social and good-time functions exclusively. Included in "local entertainment" are those things that can be supplied without considerable expense by any community with an organized convention bureau. We refer to registration and information personnel, registration equipment, stenographic service, etc. Included also is transportation of delegates by the most convenient and economical means to places of public health significance in and around the convention city. The providing of music for dancing, the printing of a directory of points of scientific interest, and other small practical items that contribute to the success of a convention are included further under the general heading "entertainment."

Since the financial responsibilities of a city entertaining the American Public Health Association have been so materially lessened, the number of annual invitations has greatly increased. No community finds the demands unreasonable. The expenses of the executive office are still to be met, however. Program building, which requires the calling together of some 25 section and committee representatives two or more times a year, is expensive. Program printing is expensive. The membership must be kept informed of annual meeting plans by mail. A publicity appropriation is an essential. An annual meeting city cannot be selected solely because a large amount of exhibit space can be sold there. Occasionally a city is chosen that makes little or no appeal to the commercial exhibitor. Then the income from the sale of exhibit space drops, but the expense of the meeting remains fairly stationary.

It is to provide a margin of safety for the executive office that the registration fee plan has been adopted. It should be borne clearly in mind that no salaries and no overhead are included when annual meeting expenses incurred by the executive office are calculated. Only

those expenses are considered that would not be incurred if no annual meeting were held.

The protest has been recorded that the registration fee penalizes the member who attends the annual sessions. It is true that he makes a nominal contribution to its costs, which the member staying at home should not be expected to pay. However, he is provided, through co-operative action, with much more than he could possibly buy by spending the same amount himself. The Committee on Meetings and Publications believes or estimates that the average delegate spends between $100 and $200 in attending a convention; hence an additional $2.00 paid as a registration fee is not a great factor in his expenses, while the total of registration fees may make the difference between a balanced income and expense statement on behalf of the annual meeting and a considerable deficit.

The committee further justifies its recommendation for the registration fee plan by calling attention to the fact that more than 50 per cent of the organizations of the country have adopted it, according to the International Association of Convention Bureaus, and "in virtually no case has the plan ever been abandoned once it was adopted." The range of fees charged is considerable, $2.00 being the minimum, and running up to $10.00 for some groups.

The Committee on Meetings and Publications feels that $2.00 for everyone attending the meeting is a fair charge. Under existing circumstances it would not recommend a larger fee, and it anticipates the day when annual meetings can be adequately financed through other methods. In the meantime, it considers prevailing practice a safe guide.

THE ANTI-INFECTIVE ACTION OF VITAMIN A

MUCH has been written concerning the vitamins, their necessity in nutrition, and in fitting the body to resist infection. In 1929, Edward Mellanby and his coworkers reported favorable results in the treatment of puerperal septicemia with preparations containing vitamin A, which led them to the conclusion that the demonstration of curative effects argued that this vitamin would have a much greater prophylactic power. Experiments on young animals with vitamin A and with carotene led them to believe that these agents were "anti-infective" in their action. They have since carried out an extensive series of experiments on pregnant women.[1] During pregnancy the mother not only has to keep her own body well nourished, but must supply all substances necessary for the development of the fetus; she

must store vitamin A in her liver, as well as supply it or its precursor, probably carotene, to the liver of the fetus. An examination of fetal livers by one of the authors has shown that the majority of them contain vitamin A in varying quantities.

For the experiment 550 women attending the outpatient department of the antenatal clinics of Sheffield were selected, all of whom were subsequently delivered in a hospital. Those who did not enter a hospital for delivery were not included in the results. Radiostoleum, a preparation containing the sources of vitamins A and D dissolved in a neutral oil, was given to the women, preferably a month before delivery, though in some cases for 2 weeks only. Without selection, alternate women were given a supply of this material with instructions for its use. There were 275 women who received the vitamin preparation, while 275 acted as controls. The number of primiparae and also those who required manual or instrumental intervention was almost equal. Other complicating factors were almost equally distributed in the 2 groups. In the group taking the radiostoleum, judged by the B. M. A. standard, there was an incidence of morbidity of only 3 cases, or 1.09 per cent, while in the control group there were 13 cases, or 4.73 per cent. At the Jessop Hospital, the morbidity rate was 5.8 per cent as compared with the average rate of 3 years for that hospital—6.8 per cent. The group receiving vitamin had a morbidity rate of 1 per cent, while the control group had 5.8 per cent. Another point of interest brought out was the fact that the total number of pyrexial cases among the women taking vitamin was 56, or 20.4 per cent, while in the control group it was 98, or 35.6 per cent, a difference of 15.2 per cent, which the authors point out is practically 4 times the standard error, and therefore significant. Among the vitamin group, only 4 women had pyrexia which lasted from 1 to 3 weeks, while there were 10 of this character in the control.

The authors believe that these results are significant, showing an increased resistance to infection on the part of the treated women, with a decrease in the clinical severity and duration of the infection when it did occur. They also concluded, on experimental evidence, that vitamin D had little to do with the results, though they do not entirely exclude it as a factor, since the normal calcium metabolism requires some source of vitamin D.

The authors of this paper are well known as careful students and experimenters. If their results are confirmed they will prove a boon in childbirth. America stands low in the list of nations in regard to maternal mortality, and any preventive measures which offer such help would seem to deserve careful investigation.

The so-called anti-infective power of vitamin A has received a good deal of attention for some years past. It has been used in hearings on filled milk before committees of Congress, the argument being that cream and butter fat aided in the prevention of tuberculosis.

Professor Mellanby and his wife, who is well known for her work on the relation of vitamins to the development of teeth, have for some 5 years taken cod liver oil daily, and during that time have been practically free from ordinary colds, which they attribute to the vitamin A. Needless to say, this is not a controlled experiment, though interesting, especially when taken in connection with the observations on puerperal women.

REFERENCE

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LETTERS FROM GREAT BRITAIN

AT the suggestion of Dr. Charles Porter, the Editor of *Public Health*, the official organ of the Society of Medical Officers of Health, an exchange of letters has been agreed upon between him and the Editor of this JOURNAL, who will be assisted by the Associate Editors of the JOURNAL in the collection of matters of interest. We are sure that Dr. Porter's letters will be of general interest to our readers, and we hope that the American letters will also appeal to the readers of *Public Health*. On our part, it can only be said that we look to England as the place of origin of modern public health. The work of Chadwick began the movement in that country, which soon spread to the United States through the foresight of Shattuck. England now has a Minister of Health in the Cabinet, with Sir George Newman as the Chief Medical Officer. The Medical Research Council of England has for a number of years put out much of the very best public health literature, based on careful studies, that we have.

As Editor of *Public Health*, Dr. Porter has direct access to the best sources of information in England. Personally, no man in that country is better fitted to select and write of health matters than he. His large experience in medical matters coupled with his legal knowledge, for he is a barrister at law as well as a physician, enables him to discuss health work from every angle.

FROM A CORRESPONDENT IN GREAT BRITAIN

THE NEW "NATIONAL" MINISTER OF HEALTH

The tumult and the shouting of what, in the journalistic phrase, is the most remarkable election of modern times having died, there remains to be seen what is to be the effect on health works in Great Britain of the various economies announced as necessary. In this connection, it may be noted that more or less of a promise was given that the activities to be least and last interfered with would be those affecting the public health. In any case, it is unlikely that anything dramatic or drastic will be attempted at first or even eventually. In selecting the Minister of Health in his administration, Mr. MacDonald, it is suggested in some quarters, was thinking more of his Cabinet than of the Department; Sir Edward Hilton Young being of the type and possessing the ability required at the present juncture, and being comparatively unheard of in relation to public health matters. As a matter of fact, statements of this kind are not uncommonly made apropos health ministers in England. The fact that the individuals appointed rarely hold the position for long, but pass on to what are regarded as higher cabinet posts, supports the view, frequently expressed, that it is something of a stepping-stone, and that particular knowledge of, or a special flair for, the work is unnecessary since the permanent officials are capable of doing all that is required. That there is a good deal of exaggeration in these statements in the case of Sir Edward Hilton Young may be taken, since, having occupied the position of Crown representative on the General Medical Council, it may be accepted that he has acquired some knowledge of preventive medicine that will prove useful at the

Ministry and beneficial to the public health at large.

THE UNEMPLOYED AND WATER WORKS SCHEMES

The possibility that the public health may require benefiting is one not to be overlooked. Considerable optimism exists in some quarters on account of the fact that the numbers of unemployed have fallen. Against this must be set, however, that the unemployment pay (the so-called dole) has been reduced, as have also wages in the bulk of the trades. Nutrition as a result is certain to suffer, and with it the health of the people. The public assistance bodies throughout the country anticipate that heavy claims will be made upon them during the winter. Local authorities also, desirous as they are to economize, are certain to find the provision made for supplying nourishment to expectant and nursing mothers and to babies, on the recommendation of medical officers of welfare centers will be heavily taxed. Among works put in hand with the object of assisting the unemployed it is interesting to note that several schemes for providing or improving water supplies are included. The city of Manchester, for example, has in hand an additional scheme estimated to cost £1,500,000 and the Durham County Water Board is engaged in the provision of a new reservoir costing about £1,000,000. Sanction to borrow up to £3,116,000 for expenditure on similar purposes was granted during the past year by the Ministry of Health. In this connection it is noted in the report of the Ministry that there is an increasing tendency toward more comprehensive schemes instead of a multiplication of small schemes, and that the larger local authorities, seeking new or additional sources, are inclined to arrange matters so that they may supply others who happen to be in the neighborhood of their aqueducts. This is all to the good, since, though the improvements in the supplies of the smaller areas, rural particularly, are most encouraging, there remains much to be done before conditions in these can be regarded as generally satisfactory. As a result of the operation of the Local Government Act, it is hoped that more active progress in this direction may be made.

LOCAL GOVERNMENT ACT AND FULL-TIME HEALTH OFFICERS

This is not the only line that progress may follow in the case of rural districts as a result of the operation of the Act mentioned. One in particular is in respect of the services of a health officer, and in this the Ministry report directs attention to a requirement of the Act that every county council after consultation with district councils shall formulate arrangements, by combination of districts or otherwise, for securing that every medical officer of health subsequently appointed for a district shall be restricted by the terms of his appointment from engaging in private practice as a medical practitioner.

For the guidance of county councils, the Ministry of Health has issued a memorandum setting out a number of methods by which the services may be secured of medical officers of health devoting the whole of their time to public duties, and describing various forms of combined appointments for consideration, e.g., medical officer of health and school medical officer, medical officer of health and tuberculosis officer, etc.

During the year, 42 health officer appointments approved were of the whole-time class, this being about half the total number of approvals granted by the Minister.

In the Society of Medical Officers of Health a considerable number of the members hold part-time appointments only, or are assistant medical officers carrying out specialist duties in relation to schools, tuberculosis, maternity

and child welfare, venereal diseases, etc. At the last meeting of the Society, one of the most important items on the agenda was the election of the President and other officers for the ensuing year. As President, Dr. Killick Millard, Medical Officer of Health of Leicester, was chosen; Dr. George F. Buchan and Dr. Charles Porter—both of whom are Honorary Fellows of the A. P. H. A.—being selected, the former to act as Honorary Treasurer, and the latter as Honorary Editor of *Public Health*, the official organ of the Society. The President contributed an interesting and thoughtful address on "Voluntary Euthanasia" in which he put in a plea that its practice, with proper safeguards, should be legalized, and submitted draft of a law which he considered would cover the points of importance.

CHARLES PORTER, M.D.

LETTERS OF APPRECIATION

AT the Montreal meeting six Honorary Fellows were elected from England. These were Sir Arthur Newsholme, Sir George Newman, Sir W. Leslie MacKenzie, James Fenton, M.D., Charles Porter, M.D., and Sir Allan Powell. Of these the last three were present at the meeting, and, together with George F. Buchan, M.D., presented a symposium on Public Health Administration in Great Britain.

The following appreciative letters have been received from The Royal Sanitary Institute and The Society of Medical Officers of Health:

Dr. Kendall Emerson, Secretary,
American Public Health Association,
New York City.

Dear Dr. Emerson,

The Council of the Society of Medical Officers of Health have directed me to tender you their sincere thanks for your kindness and hospitality to the Society's delegates who recently returned from a memorable journey in the United States and Canada. These gentlemen have reported in the warmest terms on the welcome they received, not only at the Congress of the American Public Health Association which was the main purpose of their visit but at every point of their journey.

This Society was from the first anxious to take the opportunity of sending a delegation to the Montreal Congress, but it is especially gratifying to feel that in these difficult times the links between preventive medicine on opposite shores of the Atlantic have been strengthened and our mutual understanding still further augmented.

With again many thanks for your part in making our representatives welcome,

I am, Sir,
Yours very truly,
(Signed) G. L. C. Elliston
Executive Secretary
The Society of Medical Officers of Health

1, Upper Montague Street,
Russell Square,
London, W. C. 1,
2d November, 1931.

Dr. Kendall Emerson, Executive Secretary,
American Public Health Association,
New York, N. Y.

Dear Sir,

The Members of the Royal Sanitary Institute delegation to the United States of America and Canada (Dr. Charles Porter, Dr. George F. Buchan and Dr. James Fenton) have reported to the Council on their visit, and the many interesting things which they saw, and the valuable information they have obtained.

The Council feel that great benefit must accrue from this interchange of thought and ideas between officers engaged in the service of the public health, and they desire me to express to you their sincere thanks for the kindness and hospitality which you so kindly extended to the Members of the Institute's delegation, as a result of which their visit was made so pleasant, as well as instructive.

Yours faithfully,
(Signed) J. W. Dudley Robinson
Secretary
The Royal Sanitary Institute

90, Buckingham Palace Road,
London, S. W. 1,
26th October, 1931.

ASSOCIATION NEWS

Sixty-first Annual Meeting of the A. P. H. A.
Washington, D. C., October 24–27, 1932
Headquarters, Willard Hotel

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.

Health Officers Section

Archie Cole, 318 Rose Bldg., Pampa, Tex., City Health Officer

Jaynes M. Crumb, M.D., South Otselic, N. Y., Health Officer

Emil O. Ficke, M.D., Dept. of Health, Davenport, Ia., Director of Public Health

Laboratory Section

M. Dorothy Beck, Berkeley, Calif., 1636 Josephine St., Bacteriologist

Rhoda W. Benham, Ph.D., 630 W. 168th St., New York, N. Y., Mycologist, Vanderbilt Clinic

K. H. Clough, 2015 Franklin Ave., Houston, Tex. (Assoc.)

Dr. Alfredo Iglesias, Constitucion 13, Vera Cruz, Mex., Jefe de la Unidad Sanitaria Cooperativa de este Puerto

Seymour C. Schwartz, M.D., Baltimore, Md., 4006 Bateman Ave., Student, formerly with U. S. Army Medical Corps

Vital Statistics Section

Abraham S. Pactovis, Health Dept., Quincy, Mass., Statistical Clerk

Public Health Engineering Section

Benjamin V. Howe, State Bd. of Health, Denver, Colo., State Sanitary Engineer

James M. Jarrett, LaFayette, Ga., Box 56, Sanitary Engineer, State Board of Health

Ernest H. Salmon, North Battleford, Sask., 741 Main St., Supt. of Water Supply

Food and Nutrition Section

Paul J. Zentav, M.D., 322 Beaumont Bldg., St. Louis, Mo., Secretary, St. Louis Pure Milk Comm.

Child Hygiene Section

R. Grant Barry, M.D., Wood School, Academy St., Trenton, N. J., Medical Director, Trenton Public Schools

Carl C. Dauer, M.D., 434 N. High St., Salem, Ore., Director, Child Hygiene, Marion County Health Dept.

Horace M. Fooder, M.D., 110 Black Horse Pike, Williamstown, N. J., Medical Inspector, Monroe Township Public Schools

Frederick K. Lam, M.D., Bureau of Maternity, Infancy, and Child Hygiene, Board of Health, Honolulu, Hawaii, Director

Russel H. Williams, M.D., Box W, Granville, O., University Medical Officer

Public Health Education Section

Carl L. Anderson, Ann Arbor, Mich., 108 W. Williams, Student, formerly Teacher in Health Education

Edward L. Bernays, 1 Wall Street, New York, N. Y., Counsel on Public Relations

Ethel M. Hanson, 2525 Euclid Ave., Cleveland, O., Head, Health Education Dept., Cleveland College

George H. Hoxie, M.D., Kansas City, Mo., 1000 Rialto Bldg., Medical Director, Kansas City Tuberculosis Society

Fred C. Mills, Boy Scouts of America, 2 Park Ave., New York, N. Y., Director of Swimming and Water Safety

Izetta North, 1337 N. University Ave., Ann Arbor, Mich. (Assoc.)

Armin A. Roth, 966 Washtenaw, Ypsilanti, Mich., Student, formerly Instructor in Health Education

Alma L. Wingeier, 1507 Wells St., Ann Arbor, Mich., Student, formerly Instructor in Physical Education

Public Health Nursing Section

Helen C. Manzer, R.N., 10 Sheridan Sq., New York, N. Y., Executive Officer, Comm. on Health, New York Principals Assn.

Mary Murphy, R.N., 1638 E. Wheeling Ave., Cambridge, O., Metropolitan Life Ins. Nurse

Maxine E. Owens, R.N., Fayetteville, W. Va., Public Health Nurse, Fayette County

Elizabeth I. Rood, R.N., 440 E. 26th St., New York, N. Y., Head Nurseship, operating room, Bellevue Hospital

Mrs. W. J. Ross, R.N., 10 Orchard St., Wadesboro, N. C. (Assoc.)

PUBLIC HEALTH ADMINISTRATION

The Objectives in Public Health Nursing—The National Organization for Public Health Nursing has issued a tentative statement outlining the range of public health nursing services and its various aspects. It is hoped that this may serve as a measuring stick for the appraisal of individual nursing service. Health officers have long sought a means of measuring the objectives of nursing service and of appraising their own departmental work.

The general objectives of all public health nursing services are:

1. To assist in educating individuals and families to protect their own health
2. To assist in the adjustment of family and social conditions that affect health
3. To assist in correlating all health and social programs for the welfare of the family and community
4. To assist in educating the community to develop adequate public health facilities

The objectives of public health nursing in relation to the various phases of the community health program have been enumerated for each of 12 functional divisions including: (1) Maternity, (2) Infancy, (3) Preschool, (4) School Age, (5) Adult Health, (6) Morbidity, (7) Communicable Disease, (8) Tuberculosis, (9) Venereal Disease, (10) Mental Hygiene, (11) Orthopedic, (12) Industrial Nursing Service.

(Ed.—Detailed objectives are here given for but one of these services.)

The objectives of the maternity nursing service are:

1. To get in touch with all prospective mothers as early in pregnancy as possible
2. To see that they are provided with both medical and nursing supervision throughout the maternity cycle
3. To instruct mother and father in maternal hygiene * and infant care.
4. To instruct in the preparation for delivery
5. To arrange or provide nursing assistance during delivery
6. To provide or supervise adequate nursing care to mother and to new-born baby
7. To secure physical examination of new-born baby
8. To secure medical examination for the mother

Objectives in Public Health Nursing, *Pub. Health Nurs.*, 23, 9: 439 (Sept.), 1931.

* Throughout these Objectives, "hygiene" implies the whole meaning of the term, e.g., physical and mental hygiene.

Rural Health Organization—In June, 1930, there was held at Geneva, under the auspices of the League of Nations Health Committee, a Conference on Rural Health Organization in Europe. The committee considered (1) guiding principles and suitable methods for insuring effective medical assistance in rural districts; (2) the most effective methods of organizing the health services in rural districts; (3) the sanitation of rural districts: the most effective and economical methods.

The findings and recommendations of the Conference were set down in a number of resolutions describing guiding principles and statements of fact. The Conference believed that 2,000 is the maximum number of persons who can be given proper medical attention by a duly qualified medical practitioner. In Germany it has been found that there is one physician to 2,317 persons in rural districts while in cities the proportion is 1 physician to 786 persons.

There should be available for the rural population, centers for diagnosis and specific treatment, suitably equipped and provided with a qualified staff.

There should be facilities for hospitalization and it is recommended that there should be a hospital for a population of from 20,000 to 30,000 people with about 2 beds per 1,000 of population and a minimum of 50 beds for any one hospital. There should also be provision for laboratory services and the utilization of medical specialists.

With regard to public health services, there are two principal forms of rural health organization: the form in which the state administers the local services, and the form in which the state has only supervisory functions, the local authorities being responsible for the local health administration. The optimum size of a rural health district would vary with the density of population and local disease conditions but in general should be from 20,000 to 100,000 with an average of 50,000 population. The minimum staff for such a rural health district should consist, in addition to the health officer, of 1 or more public health nurses, a sanitary inspector, and a clerk. The sanitary inspector should receive suitable training at an institute of hygiene. The services of a sanitary engineer should be made available either by the local official or by the central health organization.

It is not deemed possible to recommend a model budget for a rural health district. Funds may be derived in varying proportions from the state or from the local district. Collaboration with the medical profession and private health agencies is strongly urged.

(This publication can be obtained through the World Peace Foundation, 40 Mt. Vernon St., Boston, Mass.)

European Conference on Rural Hygiene, League of Nations, 1931.

Montreal, Canada—One of the features of the Montreal Health Department report of 1930 is an account of mental hygiene work in the Catholic schools. The work has not been started in the Protestant School Commission, but an agreement has been concluded between the Department of Health and this Commission to begin the work after the holidays in 1931. The staff consists of 3 psychiatrists and 3 psychologist nurses.

The program consists in giving special examinations to detect abnormal children, to place them in auxiliary classes where special pedagogical and technical training will be given. If the number is large enough, it is stated that special schools should be organized in addition to the special classes. It is anticipated that a special institution, like the one in the district of Quebec, should be provided for children needing this type of care. The committee on mental hygiene has received the support of school authorities in this undertaking.

During the year, 9,069 children received 3 immunizing doses at intervals of 3 weeks of anatoxine Ramon, and 5,060 were given subsequent Schick tests within 4 to 6 months. In addition to immunization work done by the department of health in its baby clinics and among school children, the child welfare association immunizes in the 13 baby clinics under its management. The "Federation d'Hygiene Infantile" carries on this work in its 18-baby clinics, as does the "Ecole d'Hygiene Sociale Appliquée." The City of Montreal supplies the anatoxine and Schick test material provided the organizations follow the methods of the department of health and report all cases immunized.

Shorewood, Wis.—Shorewood, with a population in 1930 of 13,500, reports that 2,844 pupils, or 91 per cent of the school children of the community, received health examinations during the year and that of this group 28 per cent were found to have "correctible defects." Of those children having defects, 65 per cent received treatment. In one school, 1 per cent of the chil-

dren were found to have cardiac defects of an organic nature and were referred to the family for their doctor's opinion. The functional heart cases, 52 in number (1.9 per cent), are kept under observation and restricted from competitive games unless the family physician advises otherwise. They are reëxamined at 6-month intervals, or oftener when indicated.

The policy regarding health examinations is to examine all athletes for competitive sports at the beginning of each school year, to recheck all known heart cases, to examine the new students entering schools, and give a routine heart examination to all pupils.

As the examination of pupils in a schoolroom is completed, a typewritten report of the findings is sent to the teacher in order that children with sight or hearing defects may be given special consideration in seating, and to secure coöperation and interest in obtaining corrections and an intelligent understanding of the handicapped children. The family, by note, telephone, or home call, is notified of any defects found.

It has been the practice for a nurse or physician to visit each school every morning and afternoon for the purpose of inspecting absentees and to exclude from school any children with symptoms of illness. Temperature is taken of each child inspected. No treatment is given in school except first aid in emergencies.—Annual report of the health commissioner, Shorewood, Wis., 1930–1931.

Pasadena, Calif.—The annual report of the Pasadena Health Department for the fiscal year ending June 30, 1931, is built around the *Appraisal Form for City Health Work*, and shows a rating of 817 out of a possible 1,000 points for the health work of the city. On the basis of a population of 76,210, the expenditures of the health department amount to $.80 per capita, while expenditures of other agencies for health total $1.76, including dispensary and preventorium service. In the Inter-Chamber Health Conservation Contest, Pasadena received honorable mention.

This city operates under the city manager plan, and the health officer is appointed by the city manager for an indefinite term, on a full-time basis. Upon the request of the health officer an advisory committee on public health was organized, consisting of 3 physicians, appointed by the Medical Society, plus a representative each from the Woman's Civic League, the Visiting Nurse Association, the superintendent of the hospital, and the Community Chest.

The city has been divided into districts and the nurses and sanitary inspectors under their respective chiefs are responsible for these districts. The only exception to this policy is in meat and milk inspection. "Nurses and inspectors are impressed with the fact that their work is educational as well as supervisory."

Los Angeles County Health Department, Calif.—According to the annual report of the Los Angeles County Health Department for the year ended June 30, 1931, marked improvement has been made in the general management of the department. The creation of the position of business manager and necessary office assistance to set up proper bookkeeping, accounting records and statistics, as recommended in the health survey report of 1928,* have enabled marked economies to be effected. The budget is broken up by function, and by district, and an adequate control system through proper internal forms and requisitions is maintained. Monthly balance sheets are now available to the

* This survey was made for the Los Angeles County Bureau of Efficiency at the suggestion of the County Health Officer by Ira V. Hiscock and Harry F. Scoville, under the auspices of the Committee on Administrative Practice of the American Public Health Association.

executive as well as detailed reports on expected liabilities.

The total expenditures in 1930 amounted to $1,218,064, or 4.1 per cent less than in 1929; yet the amount of floor space increased 31 per cent, the medical work in clinics 33 per cent, and communicable disease cases handled 45 per cent over the previous year. The health department served an area with a population of 705,000 in 1930 at a gross per capita cost of $1.72. The contract system of service with cities necessitates a daily time-sheet showing distribution of all work by location as well as character. Each city is given a detailed cost report annually. This work is done through the Hollerith system of punching cards from the daily service data, the sorting and tabulating being done by electrical machines. Segregation of costs by function is also thus secured economically. Special unit cost studies are also being made.

A committee was created during the year to bring together the demands of the field and health center services with the central office administration. This committee, known as the standardization committee, considers all new forms of procedures requested or inaugurated in the department. It also attempts to standardize supplies and equipment with the aim in view of eliminating excessive waste. This mimeographed report of 207 pages contains much interesting administrative information, attractive cuts and architect's floor plans of the health centers, and many statistical charts and graphs which relate to finances as well as to vital statistics.

Anderson County, S. C.—The ninth annual report of the Anderson County Health Unit for the period ending September 30, 1930, contains among other interesting features an account of a pellagra clinic held at the health unit offices where examination of patients and complete histories were made and diets were outlined. One hundred and fifty-eight patients with pellagra received instruction during the year. Pellagra is considered one of the serious public health problems of the area.

Akron, O.—A portable milk testing truck, built by the Dairy and Food Division of the Department of Health, was put into use the first of the year 1930. The farmers' milk is tested on this truck for sediment and keeping qualities at the pasteurizing plant before it is unloaded, and that which is below standard and condemned is not mixed with the other milk in the plant. This procedure has aided both the farmers and the consumers. One plant reported that in previous years, during hot seasons, they often returned, because of souring, as many as 200 to 250 cans of milk a day, while in 1930, during a similar period, they returned but 10 cans.

During the year the eradication of tuberculosis among cattle of the county and territory supplying Akron was completed and the county became "accredited." Over 98 per cent of the milk supplied to the city is also pasteurized. —*Annual Report*, Dept. of Health, Akron, 1930.

Kanawha County Health Unit, W. Va.—Through the educational system, the county health unit has been able to interest the Parent-Teacher Associations and Women's Clubs in participation in the public health program in a constructive manner. They have been the means of bringing together large numbers of parents and their children in various places throughout the county for health conferences, where members of the health unit meet for the purpose of teaching prenatal care, furnishing instruction to promote infant, preschool and school hygiene, giving instruction regarding communicable disease control, and providing artificial

immunization against typhoid, diphtheria, and smallpox. "We believe these conferences have had a most enduring effect and an educational value on account of the practical demonstrations."

There were 84 conferences held in schoolhouses during the school term and also during vacations, with an attendance of 13,000. Complete immunizations against typhoid fever numbered 7,201, against diphtheria 4,098, and against smallpox 4,538. The larger and more populated communities are said to have been previously immunized and hence the numbers protected in 1930 were smaller than for the previous year.—*Fifth Annual Report*, Kanawha County Health Unit, W. Va., fiscal year ending June 30, 1931.

Hygienic Institute, Illinois—The activities of a full-time district health program for La Salle, Peru, and Oglesby, Ill., made possible through an endowment plan, are described in detail in the 16th annual report of the Hygienic Institute. The population served approximates 28,000 and the budget for the last fiscal year was $39,000. Besides the income from endowment, each of the cities contributes to the budget. Other sources of revenue are the Tri-City Tuberculosis Society, Metropolitan Life Insurance Company, State Department of Public Health, fees from bedside nursing, and the handling of vital records. Through identical city ordinances, the executive head of the institute, known as director, has always been selected as health commissioner of each city. Each city also has a board of health, which consists of the commissioner of public health and safety, the chief of police, and the health commissioner.

The personnel of the Institute, besides the Director, consists of a bacteriologist, a sanitary officer, a chief nurse, and 6 staff nurses, a stenographer-clerk, a general service man, and 5 clinicians. The institute maintains a medical library for the use of the physicians of the three cities, and partially supports a hospital for the isolation of communicable diseases. "Modern public health discoveries and practice have so greatly reduced the need for such hospitals in the smaller cities that but 3 patients applied for admission during the past year. These consisted of 1 case of erysipelas, and 2 cases of scarlet fever."

An arrangement has been worked out with the Tri-City Medical Society, whereby the physicians vaccinate the school children for a small consideration, and the Institute has inaugurated preschool clinics, at which toxoid for the prevention of diphtheria is given. In 1929 and 1930, the city of La Salle received honorable mention in its population class, in the Inter-Chamber Health Conservation Contest of the U. S. Chamber of Commerce.

This interesting report of 67 pages is well illustrated with photographs and statistical charts and tables, and is worthy of study by public health administrators.

LABORATORY

ACCURACY OF COUNTING AN AGAR PLATE *

DR. F. L. SCHACHT AND DR. A. H. ROBERTSON

New York State Department of Agriculture and Markets, Albany, N. Y.

UNLESS the agar plate is counted accurately, the bacterial analysis is worthless. Each analyst must answer the question when counting a plate, "Shall I count this colony or not?" *Standard Methods of Milk Analysis* states that all recognizable colonies shall be counted.

During 1930 four counting contests were conducted. Thirty-five individuals counted one or more plates. One or more of 17 different combinations of counting equipment were used. A total of 38 plates were counted and 1,543 duplicate counts recorded. At each contest a system was usually followed in

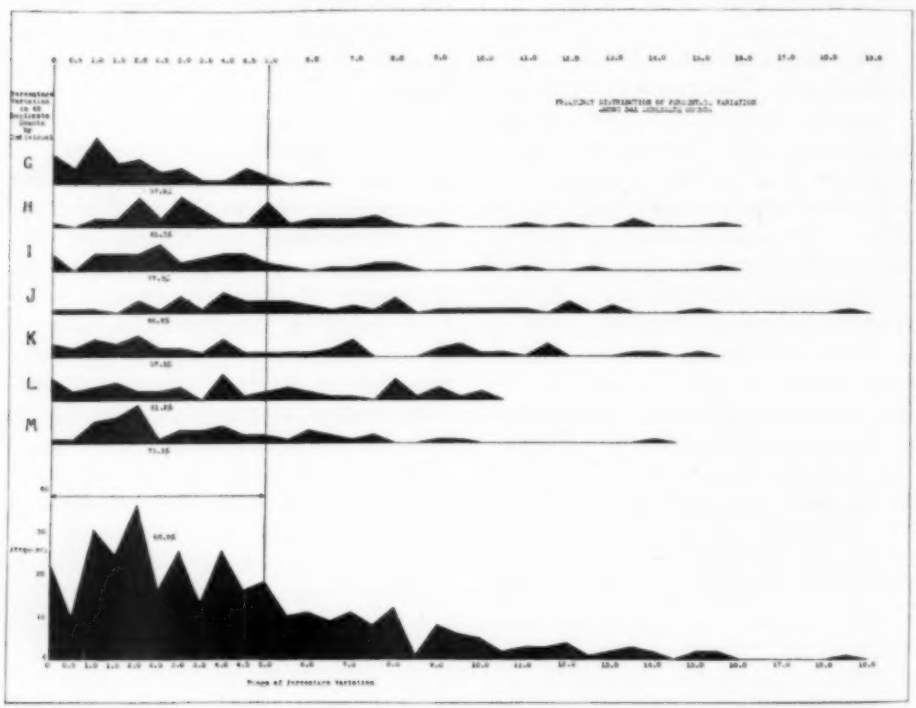

FIGURE I—FREQUENCY POLYGON OF PERCENTAGE VARIATIONS BETWEEN DUPLICATE COUNTS AMONG THE 7 ANALYSTS AT THE SYRACUSE PLATE-COUNTING CONTEST. EACH ANALYST COUNTED 49 PLATES IN DUPLICATE.

* This article was prepared by the authors, from the Annual Report of the New York State Department of Agriculture and Markets, 1930—Editor.

which 6 people counted 6 plates in duplicate, using 6 different counting devices, making a total of 72 counts on

TABLE I

OBSERVED VARIATIONS AMONG COUNTS ON THE SAME PLATE

PLATE NUMBER	Mean count	Number of individuals in contest	Number of devices in contest	Percentage variation between highest and lowest mean count calculated on the means among *		Single counts obtained †	
				Individuals	Devices	Highest	Lowest
ALBANY CONTEST							
				Per cent	*Per cent*		
1	319	6	6	21	9	374	240
2	217	6	6	49	10	319	170
3	231	6	6	6	18	286	190
4	287	6	6	9	7	344	234
5	60	6	6	21	16	74	50
6	116	6	6	16	24	144	93
SYRACUSE CONTEST							
7	115	7	7	12	7	137	96
8	50	7	7	40	17	93	39
9	124	7	7	23	10	211	96
10	275	7	7	30	14	346	134
11	200	7	7	18	12	281	141
12	68	7	7	24	25	148	53
13	102	7	7	23	10	120	80
MIDDLETOWN CONTEST, FIRST GROUP							
14	157	6	6	15	170	283	84
15	134	6	6	32	38	197	89
16	126	6	6	35	44	292	101
17	171	6	6	43	27	269	125
18	45	6	6	22	19	61	31
19	86	6	6	16	23	130	65
MIDDLETOWN CONTEST, SECOND GROUP							
20	65	6	6	68	30	127	22
21	114	6	6	21	18	165	92
22	24	6	6	22	23	35	20
23	58	6	6	18	9	70	51
24	287	6	6	18	23	354	218
BINGHAMTON CONTEST, FIRST GROUP							
25	80	6	7	16	11	95	60
26	62	6	7	15	13	80	50
27	75	6	7	12	15	88	59
28	188	6	7	11	6	214	170
29	151	6	7	16	11	196	118
30	162	6	7	2	11	179	138
31	82	6	7	24	27	133	47
BINGHAMTON CONTEST, SECOND GROUP							
32	87	6	7	47	35	138	60
33	168	6	7	68	42	231	80
34	54	6	7	74	43	86	24
35	66	6	7	49	24	110	33
36	46	6	7	66	81	107	26
37	105	6	7	37	26	160	64
38	56	6	7	46	35	84	33

* The number of counts averaged depends on the number of individuals and the number of counting devices as given in columns 3 and 4. The individual mean count is calculated regardless of device used and the device mean count is calculated regardless of individual who counted.

† These excessive variations in this column may be explained in some cases by the lack of familiarity of the worker with the counting device and in others by an unsatisfactory apparatus. The results secured on the same apparatus, particularly if a satisfactory one, are much more consistent.

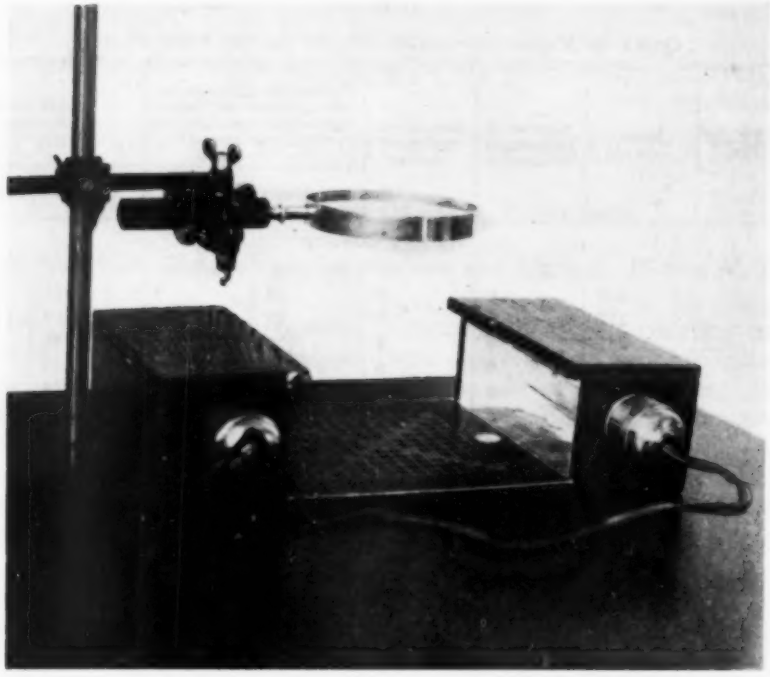

FIGURE II—A SATISFACTORY HOME-MADE PLATE-COUNTING DEVICE

each plate. A slight modification of this plan prevailed in some cases. From this information the individuals as well as the devices which gave consistently the highest and lowest counts were determined. The ability of the individuals to duplicate their counts was measured also.

The variations between individuals' counts on the same plate regardless of device used are summarized in the fifth column of Table I. The next column summarizes these variations from the standpoint of the device used regardless of the individual who counted. It is very difficult to draw sharp lines defining the variability attributable to the individual or to the device. Our opinion that the personal equation offers the greatest source of error is founded on the observation that only on 6 of the 38 plates were the percentage differences among individual's means less than 15 per cent, and 37 per cent of them were greater than 30 per cent. In contrast to this, 37 per cent of the percentage differences among device's means were less than 15 per cent and only on 9 of the 38 plates were the percentage differences greater than 30 per cent. Furthermore, a comparison of the percentage variations reveals that in nearly two-thirds of the cases, those based on the means for the individuals exceed those based on the means for the devices. Figure I graphically reveals the extraordinary wide differences among some individuals and the amazingly small differences among others when their duplicate counts, using the same device on the same plate, were compared.

The causes of error in counting are (1) failure to know what to count, (2) failure to see the colonies, and (3) carelessness. The use of a device whereby illumination can be secured from the two opposite sides and in

which the lens is held at a certain distance from the plate seems to give the most satisfactory results. A pasteboard Wolffhuegel guide plate is preferred to a glass one on account of the glare caused by artificial illumination. The count is relatively more uniform and much higher than those secured without artificial illumination. Lower counts have been secured when the engraver's lens which magnifies 2½ diameters was used both with and without artificial illumination. Figure II shows an instrument which has given satisfactory results. There may be other instruments on the market which will give more accurate results, but in the interests of uniformity as well as practicability, it is felt that some modification of the one shown in Figure II will be satisfactory.

The results of the contests also indicate that individuals should be able to duplicate their own counts on the same plate within 5 per cent and that they should duplicate the results of others on the same plate within 10 per cent. A few of the laboratory workers have demonstrated their ability to do this.

VITAL STATISTICS

Abortion in Austrian Hospitals—Interest in the declining birth rate, together with the problem of abortion, led to an inquiry by the Austrian Public Health Service into the 9,000 cases of abortion which occurred during 1929, chiefly or entirely in the hospitals of this country. While this number is not identical with the actual number of abortions in Austria it is sufficiently large to be representative, and to serve the purposes of the inquiry which were to show the dangers associated with miscarriage, and to gain an insight into social conditions.

The largest number of cases of abortion occurred among unmarried women of the age groups 21–25, and among married women of the age groups 26–30. The abortion occurred in 80 per cent of the cases in the 2d and 3d months of pregnancy, no difference being observable between married and unmarried mothers. In 9.6 per cent of the abortions, pathologic sequels developed; in Vienna alone, the proportion was more favorable, 5.9 per cent. The case mortality was 0.75 per cent (Vienna, 0.60 per cent), another proof that the care in the city hospitals gives better results. However, inquiries in the gynecologic departments revealed that the figure 9.6 for the percentage of patients suffering from after-effects of abortion is much too small.

From the personal histories of patients in any hospital of the kind, one can find in much more than 10 per cent the anamnesis that the present disorders are traceable to a previous abortion. Many cases of chronic endometritis and parametritis remain long latent. Also menstrual and other disturbances must frequently be ascribed to a former abortion.

In the 9,000 cases, death ensued in only 0.75 per cent, whereas in the combined statistics of hospitals among the causes of death, as affecting the patients in general, abortion is put down at 2 per cent. According to general statistics, as well as from the study of the

9,000 cases, it is revealed that especially the first pregnancy results in abortion (about 25 per cent).

It is not so rare for women to have from 10 to 12 abortions; indeed, there were in this series of 9,000 cases two women in whom 15 miscarriages and one woman in whom 16 miscarriages were observed. As to whether sterility is a frequent result of injuries due to abortion, only more extensive statistics can decide; but there are many indications that such is the case. It must be emphasized that these statistics, published for the first time, can lay no claim to completeness. They include not more than 10 per cent of the abortions in Austria and are to be taken as a first attempt toward the solution of this problem.—*J. A. M. A.*, 97: 1478–1479 (Nov. 14), 1931.

Tuberculosis Mortality and the Decline in the Birth Rate—Among 15 states those that show a more than average decline in the birth rate tend to show also a more than average decline in their mortality from tuberculosis; those with a relatively small decline in their birth rate have likewise a relatively small decline in tuberculosis mortality. For instance, in Germany the birth rate between 1913 and 1928 fell from 27.5 to 18.6 per 1,000. The death rate from tuberculosis fell from 14.3 to 8.8 per 10,000. In Japan the birth rate over the same period was virtually stationary, and the decline in tuberculosis mortality negligible. The same parallelism can be shown in cities, and is illustrated by the statistics of Paris and Berlin.

With the fall in the birth rate the high point of tuberculosis mortality among women of childbearing ages has shifted back from ages 30–39 in 1896 to 20–24 in 1926 (statistics from Prussia). This change, it is suggested, is related to the earlier period of life at which, owing to the fall in the birth rate, childbearing ceases.—O. Glogauer, Tuberkulosesterblichkeit und Geburtenruckgang, *Ztschr. f. Tuberk.*, 60: 7–15, 1931; *Bull. Hyg.*, 6: 681 (Sept.), 1931.

Maternal Mortality in Holland—Although according to official statistics Holland counts among the countries with the lowest maternal mortality, since the period 1916–1920, a considerable increase in the death rate has been noticed. The mortality following infection was about 7 per 10,000 confinements. The total mortality after confinements was 20–30 per 10,000. These figures were obtained from various local sources and corresponded on the whole with official statistics. It was difficult to find with certainty how this rise of mortality was brought about, but an important part may have been played by an increase of the number of miscarriages or induced abortion and sepsis, by a relatively larger number of primiparae and possibly by late marriages.—D. G. Wesselink, De kraamvrouwensterfte in ons land, *Nederl. Tijdschr. v. Geneesk.*, 75: 1555–1565, 1931; *Bull. Hyg.*, 6: 672 (Sept.), 1931.

Inquiry on Infant Mortality in Chile—An investigation of infant mortality in Chile included the following districts: Santa Ana (urban) and Hipodromo Chile (suburban), in Santiago; San Bernardo, a small village, and San Isidro (rural), contiguous to Quillota.

The districts of Santiago and San Bernardo have common characteristics: They are situated at 520 and 573 meters, respectively, above the level of the sea and have an exceptionally mild climate, with an average temperature of 13.8° C. (56.8° F.); frequent rains in winter and none in summer. The two districts of Santiago have a supply of pure water drawn from the Laguna Negra, which has a capacity of 100,000,000 cu. m.; both have a water carriage system of drainage. The district

of Santa Ana, with a population of 47,800, is divided into two sections. The southern section is composed of a wealthy or semiwealthy population; the northern section is principally inhabited by a poor, uncultured people, living in miserable, unhealthy conditions. The Hipodromo Chile District, with a population of 32,100, covers an area 4 times as large as the aforementioned district.

In December, 1927, the town of San Bernardo had a population of 10,296, a birth rate of 46.72 per 1,000 inhabitants, an infant mortality rate of 274.4 per 1,000 live births and a general death rate of 27.08 per 1,000 inhabitants. With climatic conditions similar to those of Santiago, it has an inadequate supply of excellent drinking water, drawn from the stream "El Canelo"; it has no sewerage, the drainage water going to filtering cesspools. Hygienic conditions are generally poor; poverty is prevalent, though not to such a degree as in the larger towns.

San Isidro, a rural district in the Department of Quillota, had a population of 4,600 inhabitants in December, 1927; a birth rate of 43 per 1,000 inhabitants, an infant mortality rate of 267.7 per 1,000 live births and a general death rate of 33.2 per 1,000 inhabitants. The average temperature is 14.2° C. (57.5° F.). The water supply is poor, pollution being made possible through the refuse water which is usually spilt in the street channel or on the ground.

Infant mortality during the first month, and particularly during the first week of life, which includes more than a third of all deaths, is generally due to obstetric traumatism and prematurity. Digestive diseases account for 28.2 per cent of all deaths, and acute respiratory diseases cause 26.2 per cent, the rate being higher in summer than in winter, probably because of the daily variations in temperature, which sometimes reaches 15.2° C. (59.5° F.) in Santiago and 14.8° C. (58.6° F.) in Quillota. Congenital syphilis, which was present in about two-thirds of the cases of specific infectious diseases, caused 8.7 per cent of the total number of deaths; syphilis was also the greatest cause of stillbirth; this shows the need of strengthening antivenereal measures.—Louis Calvo Mackenna, *Bol. d. Inst. internat. am. de protec. a la inf.*, 4: 426, 1930; *Am. J. Dis. Child.*, 42: 937 (Oct.), 1931.

A Study of the White and Negro Infant Mortality in Maryland, 1916–1930 Inclusive—A study of infant mortality in Maryland showed changes in the numbers and causes of deaths among white and negro infants, during the period 1916 to 1930 inclusive. The total experience has been considered in its entirety and has been divided into two periods of 1916–1923 and 1924–1930 for purposes of comparison.

The trend of birth rates in both the white and negro populations of Baltimore City and the counties has been downward. The mean rate per 1,000 population in the state for the period 1916–1923 was 23.94 for the total population, 23.37 for the white, and 26.73 for the colored population. For the period 1924–1930 it was 20.37 for the total population, 19.49 for the white, and 24.63 for the colored.

The trend of infant mortality in all parts of Maryland has been downward. The mean rate for the white race in the state for the period 1916–1923 was 93.6; and for the period 1924–1930 it was 70.7, a reduction of 24.5 per cent. In the negro race, the mean rate for 1916–1923 was 174.0 and for the period 1924–1930 it was 130.9, a reduction of 24.8 per cent. The mean rate of infant mortality in Baltimore City during the 1924–1930 period was 27.4 per cent lower for the white race than in 1916–1923. For the negro, the reduction was 27.0 per cent. In the counties, while there was a marked decline, the decrease was not so great as in Baltimore

City. The reduction was 21.2 per cent for the white population and 21.3 per cent for the negro.

A study of the principal causes of infant deaths in Maryland shows a reduction in each of them for the white and negro races, with a few noted exceptions. When the rates for the second period are compared with those for the first, the only cause of death showing an increase for the white race was injury at birth (8.1 per cent).

In the two periods, little change is found in the infant death rates from premature birth and from "other diseases of early infancy." Congenital malformations and debility showed a marked change, with a reduction of 28.2 per cent in the white and 26.2 per cent in the negro race.

Respiratory diseases showed a reduction of 16.1 per cent in the white and 15.2 per cent in the negro population; tuberculosis alone showing a decline of 31.3 per cent in the rate for the white race, and 25.3 per cent for the colored.

The most marked decrease in infant death rates, among both the white and negro races in the state, occurred in the deaths due to gastrointestinal diseases, with a reduction in the rates of 48.0 per cent for white infants and 41.3 per cent for the negro. These reductions are of special significance in view of the fact that this group of diseases is regarded as preventable and also because decreased morbidity from this cause results in a decrease of deaths from other causes. This reduction has been more marked in Baltimore City, where both white and negro death rates from this cause are lower than for the counties.

In 1930, the infant mortality rate for the white population of the state was 63.1 per 1,000 live births and that for the negro was 121.5, the rate for negro infants being almost twice that for the white race.

In both periods, the excess of the negro death rates is most marked for syphilis, tuberculosis (all forms) and the group of respiratory diseases. Injury at birth shows the least difference. In the period 1924–1930, the negro infant mortality is 1.7 times higher than the white in Baltimore City, and in the total counties the negro rate is twice as high as the white.—*Child Health Bull.*, American Child Health Association, 7: 206–211 (Nov.), 1931.

PUBLIC HEALTH ENGINEERING

Observations of Water Supplies of London and Paris—A very brief description is given of visits to the water works of Southend, Kempton Park, London, and Ivry and St. Maur, Paris. At Southend the water is treated with lime and alum, agitated, settled, recarbonated and filtered. Lime is recovered and the surplus sold. Experiments on the addition of activated carbon to the water before filtration are being carried out. At the Kempton Park plant compressed air is produced by pressure from the high water tanks. Rapid sand filters have been introduced to increase the capacity of the slow sand filters.

At St. Maur the ozonization plant, which had to be put out of action during the war because of the cost of fuel, is still intact, and may be used again. Liquid chlorine and javel water (sodium hypochlorite) are used for disinfection at Ivry. Experiments with rapid filters are being made at St. Maur. All water used in Paris is now filtered and disinfected.—E. J. Bartow, *J. Am. Water Works Assn.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 333–334 (Oct.), 1931.

Water **Softening**—The disadvantages of hard water are discussed and the three methods of softening, namely, distillation, precipitation and base exchange, are described. Distillation produces a very fine soft water, and is sometimes used for treating boiler feed waters, but is too costly for general use. The precipitation method has a fairly wide application in industries where complete softening is not essential and where the skilled supervision necessary for regulation of dosage and prolonged storage are practicable. Plants may be of the cold or hot type, the latter being speedier, requiring smaller equipment and giving better softening.

For correcting temporary or bicarbonate hardness, lime alone is used, while for permanent hardness, caused, for example, by calcium or magnesium sulphate, soda ash must also be added. The addition of sodium aluminate may accelerate the process and produce softer water.

Under optimum conditions the cold process reduces hardness to 4–6 gr. per gal., while the hot process reduces it to 2–3 gr. per gal. Base-exchange is growing in popularity because of its adaptability, efficiency (hardness is reduced to zero), simplicity of operation, automatic adjustment for water of varying hardness, and ease of regeneration. The zeolite used is a sodium aluminium silicate and softening is effected by the exchange of the sodium for calcium and magnesium in the water. The plant employed and its operation are described. The zeolite is regenerated by washing with a solution of sodium chloride. Apparatus for controlling and effecting regeneration is described and illustrated by a diagram.—Crane, Ltd., Montreal, *Technique*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 342–343 (Oct.), 1931.

The Water Resources of America: Work of the Geological Survey of the U. S. A.—The administration and finance of the investigation of the water resources of America are discussed. The study of surface waters is carried on at gauging stations and consists primarily in the measurement of the flow of streams. Investigations on

ground water deal with its occurrence, quantity, quality, and head, its recovery through wells and springs and its utilization.

Research into the principles of ground water hydrology is in progress. New apparatus has been constructed by C. H. Au, for exploring leaky wells for salinity of water at all depths by the electrolytic method. Further investigations deal with analyses of the mineral contents of both surface and underground water.

Reference is made to reports on the production of electricity; consumption of fuel by power plants, developed water power of the United States, etc. —N. C. Grover, *Water & Water Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 352–353 (Oct.), 1931.

A Complete Treatment of Sewage from Packing Houses by Superchlorination—A plant for the separate treatment of packing house effluents at Austin, Minn., is described. The flow of concentrated waste (12 times as strong as domestic sewage) is 750,000 gal. a day. The waste flows through a grit chamber and preliminary settling tank, the scum from which is removed for soap recovery to a mixing tank where chlorine is added.

Another mixing tank follows, giving a total mixing time of 20–30 minutes. The secondary settling chamber gives a detention time of 3 hours. The sludge from both settling chambers is mixed, filtered and dried. Its market value for feeding is expected to make the plant self-supporting. The effluent is clear and odorless and the condition of the river has greatly improved since the installation of the plant.

Packing house odors are also controlled by this process, which should be specially suitable if the waste is finally to be mixed with domestic sewage. The method is much cheaper than treatment by biological methods either separately or with domestic sewage.—H. O. Halvorson, *Am. City*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 360 (Oct.), 1931.

A General Review of the United States Bureau of Mines Stream Pollution Investigation—The report contains general facts and information on coal mine drainage. Streams representative of mining areas containing bituminous coal with low to average sulphur content and with high sulphur content were studied, attempts being made to determine variations in acidity and seasonal variations in mine drainage. Not only do acid waters require neutralization and subsequent softening, but the chemicals used in these processes and remaining in solution in the water cause "foaming" and "priming" of boilers. Fluctuations in the volume and strength of acid wastes increase difficulties of purification. The gravity of the problem of mine drainage is illustrated by a reference to the Indian Creek law suit in Fayette County which resulted in the sealing of a number of mines.

Acid formation in coal mines is due to the oxidation of iron pyrites to soluble iron sulphate which on hydration and oxidation forms sulphuric acid and iron oxide. The amount of pyrites varies in different parts of a coal bed, causing variations in the acidity of drainage. Outside gob piles cause increased acidity as they are composed largely of pyrites thrown out when mining or cleaning coal.

The efficacy of rock dusting as a method for decreasing acidity by neutralization is discussed. Acid wastes are harmful to fish, for, besides being toxic, they reduce the oxygen content of the water and their irritating effect on the gill follicles may be fatal. More than 4 p.p.m. of mineral acids will kill trout. Deposits on the bottom of streams resulting from pollution inhibit

fish propagation. Non-acid coal mines are referred to.

It is suggested from experience of mines and from laboratory tests on iron sulphide that sealing of mines excludes oxygen and prevents acid formation.—R. D. Leitch, Report of Investigation, Dept. of Commerce, Bureau of Mines, April, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 361–362, 1931.

The Water and Sewerage Works of Moscow—Describes an inspection of water supply and sewerage conditions in Moscow undertaken for the purpose of reporting projects for extensions. The 1929 population of Moscow was 2½ millions and plans are being made to deal with a population of 6 millions by 1950. The development of the water supply is briefly described. At present this consists of a well system furnishing about 7 m.g.d. and a supply of about 60 m.g.d. from the Moscow river.

The filtration plant for the latter supply comprises pumping plants, 6 sedimentation tanks, with 10-hour retention period, 80 pre-filters treating about 49 m.g.d. per acre, and 22 slow sand filters, operating at 4 m.g.d. per acre.

A sanitary protective zone extends for 50 miles up the river above the intake and all villages, factories, etc., in the zone are under the supervision of officers responsible for their sanitation. The general control of water supply is in the hands of the Commission for Control of Drinking Water and Sources of City Water Supply, the constitution and functions of which are lescribed. All works have well equipped laboratories and are strictly controlled by routine tests.

The author speaks very highly of the water works personnel and of the general appearance of the plants. All supplies in Moscow are metered. Careful studies have been made of the possibilities for future extensions. Supplies from the Oka and the Volga have been considered but the method decided upon is to increase the supply from the Moscow river by impounding reservoirs on the river and its tributaries.

The sewerage and sewage treatment systems comprise a separate sewer system, pumping station, irrigation plants at Lublino and Lubertzy, and an aeration plant at Koguhovsky. The oldest plant at Lublino is seriously overloaded and about 1 m.g.d. are treated by settling and contact filters. The newer Lubertzy plant gives excellent results. These plants treat about 90 per cent of the total flow. Only part of the sewage is settled before being deposited on land but settling tanks and separate sludge digestion tanks are planned. There is an experimental biological plant at Lublino and an activated sludge plant and trickling filter at Koguhovsky, treating about 3½ m.g.d., is also regarded as experimental. The trickling filters are aerated by a forced air method and work at 8–10 times the customary European rates for strong sewage.—I. S. Walker, *J. Am. Water Works Assn.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 368 (Nov.), 1931.

The Use of Active Carbons for the Purification of Drinking Waters—Active carbons, their manufacture, properties and purifying effect are dealt with. The treatment is becoming more widely used for the purification of surface water supplies, and produces a perfect tasting drinking water. Sauer at Amsterdam first suggested the use of powdered carbons for removal of bacteria and purification of water.

Later Imhoff and Sierp used granular active carbon for the purification of the city of Hamm water supply and chlorphenol tastes were eliminated. The Hydraffin filter used, which contained about 6 tons of Hydraffin, is described,

the amount of water treated being 24,000–30,000 c.m. per day. Reactivation of the carbon is only necessary every 15 months. The filter is cleaned monthly by counter flushing and occasionally regenerated by steaming.

A similar filter to that used at Hamm has been installed at Dresden to eliminate tastes in the Elbe waters. This filter is illustrated by a diagram. At Magdeburg powdered carbon has been spread on the slow filters, but this has the disadvantage of offering great resistance to the passage of the water. Purification by the " stirring in " method of applying active carbon has been used with success at Southend. In the United States highly satisfactory results have been obtained from active carbon filters and their extensive future application is certain.

The use of activated carbon for dechlorination after superchlorination is dealt with. The process is a chemical reaction rather than one of adsorption, the chlorine reacting with water in the presence of active carbon to form hydrochloric acid which is neutralized by the hardness of the water. When the dechlorinating capacity of the carbon diminishes it may be restored by washing with a hot soda solution, to which chlorine may be added, after which neutralization may be effected with calcium chloride solution, calcium carbonate being formed.

The first large water works dechlorinating plant using carbon began operation at Aussig on the Elbe in 1930. This plant and others at Stuttgart and Ludwigshafen are described. For the removal of organic matter, more particularly humic acid compounds, aeration, addition of precipitants, chlorination or biological treatment must precede active carbon treatment as saturation of the carbon is relatively rapid with organic compounds.

Resistance of carbon filters to water, choking of filters and their clearing by counter-flushing or washing with dilute hydrochloric acid are described and the cost of active carbon treatment is discussed.—J. C. Liddle, *Water & Water Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 372 (Nov.), 1931.

A Field Method for the Estimation of the Salinity of the Water in Mosquito-Breeding Places—In antimalarial work, the bionomics of mosquitoes form such an essential part that such accuracy of information as is consistent with practicability is desirable. The author suggests a simple means of securing accurate information on the salinity of water. His scheme is the simplification of the ordinary water analysis technic for the estimation of chlorides in water.

Using a 10 c.c. pipette graduated in 0.5 c.c., the delivery point is cut off and the other end is sealed so that with the pipette in an inverted position, there will be an exact number of c.c. contained in the ungraduated portion of the pipette; that is, in the portion below the zero mark. The pipette thus prepared actually is the field test tube.

Two solutions of silver nitrate are prepared; one of such strength that a c.c. will precipitate 2 mg. of chlorine and another so that 1 c.c. will precipitate 10 mg. A saturated solution of potassium chromate is also prepared.

The technic consists of filling the tube to the zero mark with the water to be tested, adding 2 drops or so of the chromate solution, and then adding silver nitrate solution, a few drops at a time, until the yellow color disappears and a permanent faint red remains. The amount of silver solution used is then read off the graduations of the inverted pipette to the nearest 0.5 c.c. The parts of chlorine in the sample can then readily be calculated, taking into consideration, of course, whether the weak or the strong silver nitrate solu-

tion was used in the test.—J. A. Sinton and N. D. Kehar, *Indian J. Med. Res.*, 18, 1 (July), 1930. From *Public Health Eng. Abstr.*, XI: Ma: 5 (Mar. 7), 1931.

The **Sea Discharge of Sewage**—Report of a paper presented at the Royal Sanitary Institute Congress, July, 1931. The relative advantages of collection of sewage from the various places in a district and its discharge through a main outfall sewer into the sea, and of separate treatment for each place followed by discharge of the effluent into the river are discussed from the financial aspect and from the point of view of satisfactory purification. Besides the cost of construction of the outfall sewer the effect on the river flow of diverting the sewage flow must be considered.

The risks incurred in discharge of sewage into the sea, such as pollution of beaches, injury to boating, bathing and fishing, etc., are mentioned. The question whether the dilution of sewage by sea water will be sufficiently large and prompt to accomplish oxidation of sewage before it can be harmful or offensive is discussed. Rate of dilution can be investigated by observations of tides and currents as indicated by floats. The dilution of sewage in tidal rivers and on a flat beach is considered.

Except under the most favorable conditions, sewage should be screened before discharge into the sea. Screening, however, removes less than 10 per cent of the suspended matter, while if the sewer is long much less will be retained owing to disintegration during transit. Before arranging for discharge of sewage into the sea careful investigations should be made as disadvantages may outweigh advantages.—G. Thomson, *Munic. Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 389 (Nov.), 1931.

The History of Sleeping Sickness in the Sudan—This is an interesting account of the methods used to control sleeping sickness in the Sudan and the article should be read by those interested in insect-borne diseases.

It has been found that the most satisfactory method is to concentrate the sick people in villages or along roads adjacent to streams that can be kept clean and free from vegetation. This method makes use of the fact that wild and uninhabited country abounds in the fly carrier of the disease while concentrated groups under good surroundings and open streams are not invaded by flies. These measures were used to prevent the spread of infection rather than being aimed at the center of the epidemic.

The various superstitions of the people and their tribal customs were gradually overcome and adjusted to this new method of living and the task of extirpating a disease has in fact profoundly affected the life of the people. Up to the end of 1928 over 5,400 cases of sleeping sickness were treated in the Sudan. Where sleeping sickness had gained a footing a considerable epidemic was brought under control in the space of 2 years, and infection shut out from a district 5 times the size of Wales. The author considers the methods used to be effective and states that the epidemic lingered only where the medical and administrative staff was inadequate. —G. K. Maurice, *J. Roy. Army Med. Corps*, 55, 4: 241–259 (Oct.), 1930. From *Pub. Health Eng. Abstr.*, XI: Ma: 5 (Mar. 7), 1931. Abstr. H. A. Johnson.

FOOD AND NUTRITION

The Effects of Radiant Energy on Milk Anemia in Rats—Two different types of radiant energy were compared in this experiment on rats suffering from nutritional anemia. The stock diet consisted of a commercial meal supplemented by lettuce, and the milk diet was prepared from commercial powdered milk in a solution containing 12.5 per cent of solids. Hemoglobin determinations and weighing of rats occurred once a week. The sources of radiant energy used were a "Pan-Ray-Arc" burning National Therapeutic A "Sunshine" carbons and an air cooled Cooper-Hewitt quartz mercury vapor lamp. A group of 16 rats were exposed to sunshine for ½ hour daily during June and July. Using the quartz mercury vapor lamp, the differences in hemoglobin between the irradiated and non-irradiated groups were not great. The mean value for animals surviving 10 weeks or longer is 8.29 gm. in irradiated animals, against 5.80 gm. in the controls. Irradiation with the flaming carbon arc resulted in hemoglobin values only equal to or lower than the controls. The group of rats exposed to sunshine had hemoglobin values in 7 weeks slightly higher than in control rats exposed only to subdued daylight, 8.4 gm. as compared with 6.7 gm. While the iron input was low, the rats were undoubtedly getting sufficient to maintain a balance at low hemoglobin levels. In some experiments, iron was added to the diet, but hemoglobin regeneration was no more rapid than in the controls. —Paul C. Foster, *J. Nutrition*, 4: 517 (Nov.), 1931.

Viosterol and Cod Liver Oil—In this study, viosterol was compared with cod liver oil on 3 groups of rats on 3 different diets. In the first series, diet B consisted of a purified ration with 80 mg. of yeast; diet D, the same plus ½ drop of viosterol daily, and diet C the same plus ½ drop of cod liver oil daily. The rats were on this diet from 54 to 62 days. The average weight at the beginning was approximately 72 gm., and at the end of observation, 55.1 gm. on the B diet, 58.2 on the D diet, and 80.6 on the C diet.

Another series was run in which the B diet was supplemented with ⅕ drop of cod liver oil and ½ drop of viosterol daily after xerophthalmia developed.

Another series contained 3 variations of the diet, Bb, the ration plus 80 mg. of yeast daily; after xerophthalmia, ⅕ drop of cod liver oil and ½ drop viosterol daily, and diet Bc, the ration plus 80 mg. of yeast daily; after xerophthalmia developed ½ drop of cod liver oil daily, and diet B, the ration plus 80 mg. of yeast daily. The xerophthalmia was cured in an average of 5½ days on the modified diet. The D diet was comparable with the modified D diet in that ½ drop of cod liver oil was added daily after xerophthalmia developed. The second series of the experiment on the purified food was supplemented with 1 gm. of yeast daily and otherwise modified with viosterol and cod liver oil as in the preceding. The rats developed greater weight gains with the additional yeast but developed xerophthalmia except where cod liver oil was added.

Rats on the B and D diets in the second series showed pus in the nasal sinuses and abscesses on the tongue but not on the C diet containing the cod liver oil. The quantity of viosterol administered was alleged to contain the same antirachitic potency as cod liver

oil but this amount did not produce as good calcification. In the rats which developed xerophthalmia there were an inflamed respiratory tract, discolored liver, and spleen and other abnormal conditions of the organs. The addition of viosterol increased calcification of the bones but did not prevent or cure xerophthalmia.

The addition of cod liver oil not only cured xerophthalmia but produced a better calcification of the bones. The authors conclude as follows:

> Since "colds," malnutrition and intestinal inadequacies are more frequent in children than rickets, this study emphatically suggests that the apparently widespread substitution of viosterol for cod liver oil in the diet of the child is not logical and may result in an appreciable decrease of the child's strength and resistance to infections.—

E. O. Prather, Jr., Martha Nelson, and A. Richard Bliss, *Am. J. Dis. Child.*, 42: 52 (July), 1931.

Value of the Oyster in Nutritional Anemia—Many other metallic elements besides copper have been studied in connection with hemoglobin regeneration in nutritional anemia with somewhat conflicting results, although a general agreement that both copper and manganese are effective in supplementing iron. The oyster contains these elements, with others, and in addition contains iodine, vitamins A, B, C and D. This experiment was undertaken to see how effective the oyster would prove as an anti-anemic food.

Rats were fed the Sherman diet consisting of whole wheat, whole milk powder, meat scrap and salt, containing 125 mg. of iron and 4.1 mg. of copper per kg. The average hemoglobin value for the experimental rats was found to be 11.79 gm. per 100 c.c. of blood. Rats were rendered anemic with commercial whole milk powder and sufficient water to reconstitute average milk. In the period from 6 to 8 weeks the average hemoglobin value of the milk-fed diet had decreased to 5.68 mg. per 100 c.c. of blood, as compared to the stock ration at that time of 15.3 gm. The anemic rats were divided into groups.

Oysters from the South Carolina coast were shucked and dried in the laboratory and analyzed for copper, iron and manganese. Composite samples of dried oysters containing 892 p.p.m. of iron, 58 p.p.m. of copper, and 20 p.p.m. of manganese, were fed at a daily level of 0.56 gm., the highest dose, to 0.14 gm. the lowest. In addition, 3 concentrations of a hydrochloric acid solution of oyster ash were prepared, corresponding in iron, copper and manganese to the levels of the dried oysters. Both the dried and the oyster ash showed practically the same hemoglobin regeneration. The hemoglobin value on a maximum dosage rose rapidly with complete regeneration in 2 to 3 weeks. In 4 to 5 weeks, there was regeneration with the 0.28 gm. dosage. The 0.14 gm. dosage failed to restore hemoglobin to normal value.

At the end of the 8-week period, the average reached 12.0 mg. per 100 c.c. or approximately 80 per cent regeneration. In addition, a prepared solution of iron, copper and manganese resulted in approximately the same hemoglobin regeneration as when fed dried oyster or oyster ash on the same copper, iron and manganese basis.—Harold Levine, Roe E. Remington, and F. Bartow Culp, *J. Nutrition*, 4: 469 (Nov.), 1931.

The Pellagra-Preventive Value of Canned Spinach, Canned Turnip Greens, Mature Onions, and Canned Green Beans—In testing canned spinach, a California brand was used, and a daily allowance of 482 gm., including the can liquor, was permitted. A table gives the composition of the basic diet in each of the tests made. This spinach-supplemented diet was given to 16

colored female inmates of the State Hospital at Milledgeville, Ga. Fourteen of these remained under observation for 1 year and one developed symptoms of pellagra near the end of the 11th month.

The same test was made with canned turnip greens. In this experiment, 16 inmates were used, 15 of whom were under observation for 1 year. No symptoms of pellagra were observed.

A commercial variety of red onions was used. The dry outer skin was removed and the remainder chopped and steamed until done. Table salt to season was added. Each patient was given 525 gm. per day with the same basic diet as in the tests with spinach and turnip greens. Ten white female inmates were used. Five developed pellagra within 3 months. When the 5th case appeared the test was discontinued.

In testing canned string beans, 550 gm., including the can liquor, were given daily. Fourteen white female inmates were used, 12 of whom were under observation for a significant period. Two developed pellagra within 7 months, 1 during the 8th month, and 4 during the 9th month, at which time the test was discontinued.

It will be noted from these tests that canned green beans and mature onions are a very poor source of the pellagra preventive vitamin, while canned spinach and canned turnip greens, though not especially rich in it, are considered an important contributory source of this factor.—G. A. Wheeler, *Pub. Health Rep.*, 46: 45 (Nov. 6), 1931.

The Effect of Partial Depletion of Vitamin B Complex upon Learning Ability in Rats—Complete depletion of the vitamin B complex results either in beri beri or pellagra, and with partial depletion a nervous derangement may result in children and not in adults. While beri beri is prevalent in the Orient, it has occurred in Newfoundland, Labrador and Norway, and is not confined to a rice diet. Flour and other milled cereals and highly refined foods are notably deficient in vitamin B complex, constituting a nutritional problem in the case of children.

With these facts in mind, an investigation was undertaken to study the effect of partial depletion of vitamin B complex on rats. The animals were depleted during the nursing period by depleting the diet of the mothers, during nursing, in yeast and wheat germ and feeding the young a diet first deficient in and later free from vitamin B complex.

Four groups were studied: (1) controls on normal diet, (2) depleted of vitamin B complex through the mothers' diet until weaning, (3) mothers on depleted diet but young on rich vitamin B diet, and (4) young depleted during the nursing period and from parents depleted of vitamin B in their early life. After weaning, the rats were given a vitamin-rich diet and the body weight brought near to the controls. After the controls were weaned, the growth was checked with a vitamin-B free diet for a brief period and then each group placed on the same diet of vitamin B-free food plus brewer's yeast.

After 21 days, or at the age of 70 days, the rats were trained in a standard maze once a day for a week and then required to run the maze once daily the first 3 days, then two trials daily until the problem was learned, the criterion being 8 correct out of 10 problems.

A brief summarization of the scores shows that the animals depleted of vitamin B through the mother's nursing diet were inferior to learning to the normal animals with large differences. The offspring of rats which were depleted of vitamin B complex in early life and again depleted during their nursing period were much inferior in learning ability. The offspring of depleted animals

on a vitamin B-rich diet showed adaptability equal to that of normal animals, suggesting that the learning ability of the second generation is not affected by early depletion of vitamin B of the first generation.

The offspring of animals depleted during the nursing period have a learning ability equal to that of the parents, indicating that the detrimental effect is probably not hereditary but traceable to the dietary factor.

Several references to the literature are quoted in which the dietary factor of malnutrition in the nervous mechanism of children is discussed. These investigators believe that the investigations on children indicate a definite relationship between dietary deficiency and higher nervous functions and believe that with the prevalence of highly milled flours and refined cereals it is necessary that vitamin B complex should be supplemented in the diet of expectant and nursing mothers as well as of the infants and children.—Siegfried Maurer and Loh Seng Tsai, *J. Nutrition*, 4: 507 (Nov.), 1931.

INDUSTRIAL HYGIENE

Medical Service of the Bell Telephone Company of Canada—The company occupies about 140 buildings in which questions of ventilation, heating, lighting, sanitation, etc., appear. In addition, it endeavors to ameliorate the home living conditions of its people through the method of instruction.

"Our Plan," as it is called, was inaugurated 15 years ago to cover medical services, sickness disability benefits, pensions, death benefits, etc. The endeavor is made to treat all employees alike. The medical work includes: First aid in which we are affiliated with the St. John's Ambulance Association, and the company now has 4,500 fully trained to render first aid anywhere; accident prevention work in which there is a continuous campaign and which has yielded remarkable results; and a health course for women leading to a certificate of proficiency, with quite satisfactory outcome.

Employees make no payment toward this plan or for any medical service rendered, although the company treats only minor and emergency conditions, referring usual sickness and fee arrangements to outside doctors. The plan provides for the payment of wages during sickness on a graduated scale (particulars given).

The medical department is under the direct supervision of the senior vice-president and comprises a medical adviser, a medical examiner in Montreal, and another in Toronto, all of whom are part-time salaried employees; 2 full-time nurses (although there are several other nurses engaged mostly in welfare work); 3 accident surgeons in Montreal and 3 in Toronto; and 120 doctors at other points in the company's territory, all paid on the basis of the work they are called upon to do. Mutually agreeable arrangements are also made with outstanding specialists in various departments; e.g., X-ray, biochemistry, chest conditions, etc. These persons do indicated work, the expense of which is borne either by the employee or the company at the discretion of the medical adviser.

With this medical machinery there is maintained: (1) general supervision of sanitary matters throughout buildings; (2) the same in connection with construction camps, with the finest coöperation on the part of the provincial boards of health; (3) advice to all departments of the company, especially the legal and personnel departments; (4) examination and medical classifications of all applicants for positions—the 4-class system being used, viz., (*a*) those physically suited for the position desired, (*b*) those physically unsuited for the position desired, but able to be placed in some other kind of work—in which placement a benevolent attitude is maintained, (*c*) those physically fitted but who need surgical or medical aid to correct unsound conditions, and (*d*) those not physically suited for any position—in which experience has shown comparatively few cases occur and these unemployable people will probably have to be looked after sooner or later by the State; (5) the carrying of all accident cases to a conclusion; (6) coördination and coöperation regarding medical reports to attending physicians; (7) the making of physical examinations for outside physicians, using the special equipment which the company has, care being taken to observe all ethical considerations; (8) in the Montreal and Toronto areas, the perfection of arrangements whereby any employee may

apply for a medical examination and advice; and (9) the maintenance of service for minor medical or surgical conditions.

The author concludes as follows:

1. It is my belief that no industrial or commercial organization is justified in maintaining a medical service that is not financially profitable.
2. A well designed and well conducted medical service is a profitable venture for any company with 1,500 employees or over.
3. A fairly extensive experience has convinced me that such a service can be maintained without conflict with private practitioners, if reasonable ethics are practiced.
4. When a medical service is carried on along the lines indicated in my remarks, I believe it cannot fail to be conducive to public welfare.

—A. R. Pennoyer, M.D., Medical Director, The Bell Telephone Company of Canada. Abstract of paper presented before the Industrial Hygiene Section of the A. P. H. A. at the Sixtieth Annual Meeting at Montreal, Sept. 16, 1931.

E. R. H.

The Significance of Industrial Health—Perhaps half a century after the beginning of the modern public health movement, industry began organizing departments of preventive medicine. Industrial health is the fourth step in evolution of such services, being preceded by first-aid to the injured, a first-aid office within the plant, and compensation. We, as health officers, saw diseases against which we warred decreasing, in the list of the ten most important, but accidents gradually working their way to the top, yet recognized as preventable.

We are sorry that the National Safety Council developed its task so apart from health departments, as it could have learned more economically from our experience. In the field of education we had already been experimenting a long time so that we felt that the council and the health department would have exchanged views and experiences with profit. Nevertheless, we are glad to have the council enter the field and we admire it for the success achieved.

Logically, after accident prevention came medical care in industry, and soon the realization that limiting oneself to the care of end-products is wasteful and prevention much more economical. Today industry has fewer rights with the employee than ever before in the history of society and the relations are becoming less personal and more on a basis of economics. This is more true of health than of other features. While we think industrial health loss is no mean item in figuring costs, employers are apt to think our judgment not well balanced and that health is magnified by us.

With the disappearance of the great epidemics of history, health people have not one basis left for an emotional appeal of great power and the public mind is not prepared to support health work on the basis of judgment. Here the intervention of industry is of almost priceless value and demonstrations by industry are motivating the situation. It is also possible for industry to require certain health practices and to secure coöperation in effecting them that cannot be otherwise accomplished. Its influences are also carried into the homes. Here it is practically impossible to maintain a line of demarkation between the workman and his family when it comes to applying the principles of prevention. Thus industrial health is significant from the standpoint of future health improvement.

The earlier tasks of health work are nearly consummated—communicable diseases. Shortly health work will be concerned chiefly with the degenerative diseases in the prevention of which persons and groups must change their habits and customs. Degenerative diseases result from the acts

and attitudes of the individuals concerned and prevention is much more difficult than the matter of fighting a microbe. Comfort or cost interposes to prevent action. It is also more difficult because well people are called upon to change their habits to prevent illness. Also, because what is done must be long continued.

The health forces will continue to need the example and help of industry, such as entrance physical examinations, periodic physicals, fitting men to jobs, and others. The proof that industrial health pays is regarded as non-conclusive by some employers, but it is necessary for efficiency of labor—and not for the regulation of death rates or even the lessening of sickness rates.—William A. Evans, M.D. Paper presented before the National Safety Council, Health Division, Chicago, Oct. 12, 1931.

E. R. H.

Lead Poisoning in Brass and Bronze Foundries—Thirty-eight men engaged in the founding of high lead (railroad) bronze were sent to the Montreal General Hospital for various complaints. Of these, 24 were found to be suffering from acute lead poisoning; 9 others showed definite evidence of lead absorption; and only 5 showed no signs of plumbism. Railroad bearing bronzes may contain lead up to 20 per cent.

Three brass polishers who succeeded each other on the same emery wheel became poisoned with lead. The amount of lead in the alloy was below 6 per cent.

Blood smears of 26 men engaged in the polishing of low lead brass and bronze (less than 6 per cent) were examined. Five of these showed stippled cells, well in excess of 200 p.m. red cells.

The analysis of air in one foundry showed the concentration of lead in the air to be about 0.85 mg. per cu. m.

Our review of the literature of chronic brass poisoning indicates that many cases of chronic disability occur among founders and polishers of brass, and that the symptoms recorded are closely allied to those of lead poisoning.

It is our belief that lead plays an important part in the disease picture variously diagnosed as brass poisoning, bronze poisoning, and copper poisoning. —Frank G. Pedley, M.D., and R. Vance Ward, M.D., *Canad. M. A. J.*, XXV: 299–303, 1931. E. R. H.

Changes in the Ionic Content of Air in Occupied Rooms Ventilated by Natural and by Mechanical Methods—This paper presents the results of a research conducted by the authors at the laboratories of Industrial Hygiene at the Harvard School of Public Health. It is pointed out that previous investigations have been unsuccessful in explaining the cause of the deadness, or lack of stimulating quality present in the air of occupied spaces.

The object of this investigation was to study the ionic content of the atmosphere in relation to ventilation and health. It will be recalled that the atmosphere consists of atoms, molecules and molecular groups (in addition to suspended dust particles) and that these elemental forms of matter are electrically charged either positively or negatively.

The ionic charges were measured by means of a modified Ebert apparatus.

Measurements of the ionic content of indoor and outdoor air disclose very definite seasonal trends; the content being much higher in summer than in winter; higher on clear days than on rainy or foggy days, and, as a rule, higher in the daytime than at night.

Studies of the ionic content of the atmosphere of small rooms showed that the content in unoccupied heated rooms did not differ much from that out of doors. In occupied rooms the ionic

content fell immediately as the room was occupied and this low level of ionic content was maintained until the occupants departed, after which a rise in ionic content immediately resulted.

A most interesting experiment was conducted in an attempt to determine the amount of air supply required to maintain normal ionic content (original content) in a crowded room. These experiments showed that 160 cu. ft. per person per minute was required in order to accomplish this end. A supply of 30 cu. ft. per person per minute did not raise the ionic content above the level attained with no ventilation.

The authors found it possible by artificial ionization to control the ionic content up to 10,000 ions per c.c.

(The authors of this paper are to be congratulated on a most careful and painstaking study in the field of ventilation research, and one which should be watched with considerable interest by persons associated with this field of endeavor.)—C. P. Yaglou, L. Claribel Benjamin and Sarah P. Choate, *Heating, Piping and Air Conditioning*, Oct., 1931, pp. 865–869. L. G.

Manufacture of Leather Gloves—This syllabus compiled by technically informed persons with a review of health hazards by Dr. C. P. McCord is devoted only to the making of leather gloves and does not include dyeing or leather tanning and dressing of skins and hides. The historical background of the industry, its extent and scope, and its present economic status (which is good despite the prevailing depression) are adequately discussed, while there is a section on conditions in individual plants.

The process of manufacture from the time when the skins arrive at the factory to their completion as gloves, including fur-lined gloves, is briefly described. The potential health hazards no doubt increased during the ages, especially in the days when gloves were often termed "digitalia" (prior to the 11th century), but have been left largely behind with the tanner and dyer. There are still objectionable elements in glove making as a home industry, but such industry is subsiding. Nominal hazards only exist in modern glove making. A classification of jobs with their chief health and accident hazards is detailed.—Retail Credit Company, Atlanta, Georgia, *Indust. Rep.*, 6, 10: 111–124, illus. (Oct.), 1931.

E. R. H.

Quantitative Measurements of the Inhalation, Retention and Exhalation of Dusts and Fumes by Man: II. Concentrations Below 50 Milligrams per Cubic Meter—In 1928 Drinker, Thomson and Finn reported a series of studies on the inhalation and retention of dusts and fumes of a concentration of from 50 to 450 mg. per cu. m. The present study was designed for the purpose of making similar determinations at concentrations less than 50 mg.

Briefly, the dust or fume was set up in an airtight chamber from which it was delivered by the subject's inhalation through a face mask, while the exhaled air was passed through an electric precipitator, thence to a spirometer for volume measurement. The dusts used were magnesium oxide and calcium carbonate. In all 422 experiments were conducted on 32 subjects breathing normally while at rest; mouth breathing while at rest; breathing normally during exercise; and during the inhalation of approximately 5 per cent carbon dioxide.

The authors conclude "the percentage of magnesium oxide retained during normal breathing while at rest varied from about 60 per cent at a concentration of 10 mg. per cu. m. to 45 per cent at 50 mg. per cu. m. The percentage of calcium carbonate retained under the

same breathing conditions varied from about 80 per cent at 10 mg. per cu. m. to 70 per cent at 50 mg. per cu. m.

The percentage retention for mouth breathing while at rest and for normal breathing during exercise and during carbon dioxide inhalation was about 10 per cent less than for normal breathing while at rest under the same conditions.

The percentage retention changed but little at concentrations above 50 mg. per cu. m., but apparently rapidly approached 100 per cent as the concentrations fell below 10 mg. per cu. m.—Carleton E. Brown, *J. Indust. Hyg.*, 13, 8: 285–291 (Oct.), 1931. L. G.

Studies in Dust Retention: III. Factors Involved in the Retention of Inhaled Dusts and Fumes by Man—In the previous study of this series it was found that the percentage retention of magnesium oxide and calcium carbonate dusts presented considerable variation, and the present study of the previous data was undertaken in an effort to determine the cause for these differences. In the present analysis the number of respirations, volume of respiration, minute-volume and vital capacity were analyzed, as well as the physical properties of the inspired dust and air, including particulate size and "wetability," and the relative humidity of the inspired air. Most of the author's summary follows:

1. Percentage retention is inversely proportional to respiration rate for rates below 20 per minute. An increase above 20 per minute is apparently followed by no change in percentage retention.
2. Percentage retention is inversely proportional to minute-volume of air breathed. This effect probably results from the increase in respiration rate with minute-volume.
3. Percentage retention is directly proportional to particulate size (not particle size) and to density of dust suspended in air.
4. Percentage retention is directly proportional to extent to which the dust is wetted in passing through water.

The results also show that percentage retention apparently is not affected by the following factors:

1. Volume per respiration.
2. Vital capacity.
3. Relative humidity of inspired air.

—Carleton E. Brown, *J. Indust. Hyg.*, 13, 9: 293–313 (Nov.), 1931. L. G.

Injuries Produced in the Organism by the Discharge from an Impulse Generator—The authors of this paper have set out to determine whether there is danger to life associated with the discharge of the impulse generator producing a current with a crest value of approximately 100 amperes at a maximum of 20,000 volts. Etherized rats were used as the experimental animal and in all 36 experiments were conducted. It was found that when the animals were placed on a grounded copper plate and the current was permitted to enter through the head, through the center of the back at the level of the scapulae or through the lumbar region, little or no damage was produced by the electric surge. In general it was found that when the surge was permitted to traverse the length of the animal, the heart continued to beat for but a short time or ceased beating immediately upon application of the current. Where the current entered in the skin of the dorsal midline of the mid thoracic region and traversed the animal to the tip of its tail, 3 rats survived and 1 died after breathing spontaneously for a few minutes. Similarly when the current entered one of the fore limbs and traversed the length of the body the heart, in most cases, continued to beat, although one of the animals died while others recovered.

It is concluded that the greater the portion of the body that is included in the path of the current, the greater the damage to the organism, and further

this damage is increased the greater the length of nervous tissue traversed by the discharge.

The present contribution, while brief, contains many statements which are not included in this abstract. Those particularly interested in the subject of electrical injuries are urged to refer to the original.—Orthello R. Langworthy and William B. Kouwenhoven, *J. Indust. Hyg.*, 13, 9: 326–330 (Nov.), 1931.

L. G.

Warning Agents for Fuel Gases—This bulletin presents the results of work done under a coöperative agreement between the U. S. Bureau of Mines and the American Gas Association. A copy of the agreement is included in the foreword, as well as the list of the gas companies and technical advisers concerned with the study.

After a discussion of the previous uses or suggested uses of warning agents, both in Europe and America, the types of these agents in respect to certain properties and a list of 93 compounds representing 36 different types were considered in the present investigation, carried on during the period of 1926–1930. Certain groups of substances were discarded immediately on the basis of such factors as toxicity, corrosion, or lack of stability. The intensity of the odor or irritating properties was measured for 57 substances which were thought to include the most promising agents. Eventually these were narrowed down to a few which appeared the most practical.

Neither pleasant nor unpleasant odors were found effective in waking persons unless present in very high and impractical concentrations. Eye, nose, and throat irritants were effective in practical concentrations. Most halogen-bearing compounds would appear unsuited because of corrosion of appliance parts, utensils, and household furnishings.

Ethyl mercaptan was found to be the most promising warning agent of the unpleasant odor type. While it is very effective in attracting attention and, when installed in city gas mains, was the cause of more complaints of leaks than any other material used in field tests, it was not found capable of awakening sleeping persons. Its very cheap cost was, however, a chief item in its favor. Amylene possesses an odor similar to manufactured gas and is rapidly transmitted to all places in the distribution system, but is not a commodity of commerce at present although it is estimated that its cost could be made similar to that of ethyl mercaptan. In fact, butylene, amylene, and Pintsch-gas condensate were transmitted through the distribution system very much more rapidly than the other substances tested.

Full scale and longer field tests in a number of different distribution systems are needed to procure the final answer for many different gas-service conditions that prevail in practice. In fact, final conclusions can only be made after practical trials are made in the industry over an extended period of years.

Crotonaldehyde was found to be second to ethyl mercaptan as the most effective compound for causing complaints of leaks in the field tests made. In these field tests, two cities having a population of 4,000 and 30,000 were used. The odorizing of natural gas with ethyl mercaptan was found not only to be practical for detecting certain types of leaks but much cheaper than usual inspection methods.

Odors are most valuable in giving immediate evidence of a contaminated atmosphere on entering a given premise, but nasal fatigue and temporary impairment or a loss of sense perception occurs rapidly. With irritants there is a lag in the sense perception which increases with the period of exposure; hence these are more satisfactory to indicate a gradual increase from low con-

centrations. For equal intensities, unpleasant odors were found to be far more effective than pleasant odors. Nose and throat irritants, including sternutators or "sneeze gases," were found in laboratory tests to be very effective in waking sleeping persons. In the end, investigators considered the field tests made too limited in both time and scope for final conclusions.—A. C. Fieldner, R. R. Sayers, *et al.*, U. S. Bureau of Mines, *Monograph 4*, 1931, 177 pp. E. R. H.

The Toxicity of Methyl Chloride for Laboratory Animals—In this research guinea pigs were exposed to concentrations of methyl chloride in three groups, averaging 49, 77, and 140 p.p.m. of the gas. The minimal lethal concentration of this gas for 72 hours' exposure of the test animals was found to be about 75 p.p.m. All of the animals exposed at 49 p.p.m. recovered, and all of the animals exposed to the average of 140 p.p.m. died. Food in the form of carrots exposed to methyl chloride absorbed traces of this gas but subsequent feeding of the carrots failed to produce symptoms in the guinea pigs. The most constant pathological changes were changes in the lungs and the meninges.—John L. White and Paul P. Somers, *J. Indust. Hyg.*, 13, 8: 273–275 (Oct.), 1931. L. G.

The Rôle of Punctate Basophilia in the Control of Industrial Plumbism—As a result of this study conducted among workers in the electric accumulator trade the authors conclude that punctate basophilia (Sellers' method of staining) is often present in normal subjects and practically always present in workers exposed to a lead hazard. The value of punctate conditions in the diagnosis of plumbism is limited, but as an aid in the prophylaxis of plumbism, such conditions are of real value.—Ronald E. Lane, M.B., *J. Indust. Hyg.*, 13, 8: 276–284 (Oct.), 1931. L. G.

A New Instrument for Measuring Cooling Power: The Coolometer—Author's summary:

The paper describes a new instrument of great sensitivity for measuring the cooling power of an environment. Its essentials are a copper spool covered with a copper shell, the spool being wound with heating coils which constitute also an electrical thermometer operating on the null principle to hold the desired temperature. The current input when the desired temperature is reached gives the rate of cooling, when combined properly with the constants of the instrument. The instrument can be operated as a reflecting or a black body, and thus can be used to study radiation. With the reflecting surface it can be used as an anemometer. Its construction is such that recording devices can be applied. It can be operated dry, or covered with a wet wick. —Walter S. Weeks, *J. Indust. Hyg.*, 13, 7: 261–265 (Sept.), 1931. E. R. H.

CHILD HYGIENE

DURING 1931 we have presented in these columns, from month to month, the elements which make up a complete child health program. Beginning with maternal and early infant hygiene the program was developed, one step at a time, until the child was well established in school life.

The reports from various committees of the White House Conference on Child Health and Protection have begun to appear and promise an encyclopedic array of material on every phase of child life. Now that this wealth of material is available, let us turn our attention to the actual developments.

This year we propose to address ourselves to the presentation of practical child health projects and organizations as they are actually set up and functioning in different parts of the country. It is hoped that members of the Association will send to the editor reports, organization plans, and current material relating to child hygiene in their communities.

We have just received a splendid report of the opening of a unique public school, in Battle Creek, Michigan, which aims to meet the needs—physical, mental and social—of all types of children. This is the Ann J. Kellogg School, made possible by a magnificent gift from W. K. Kellogg in memory of his mother, for whom the school is named.

The Battle Creek Public School Department has issued a bulletin concerning this school from which the following material is taken:

FACTS ABOUT THE ANN J. KELLOGG SCHOOL

Battle Creek, Michigan

I. Purpose

1. The purpose of the Ann J. Kellogg School is to bring equal opportunity to all types of pupils for the development of those individual abilities which will enable each to meet most effectively the obligations of life.

2. The school was built in memory of the mother of W. K. Kellogg, whose proffer of a gift to the Battle Creek Public Schools made possible this institution. The building is pleasantly situated on a shaded residential street within a stone's throw of Ann J. Kellogg's first home in Battle Creek.

II. Building

1. The building was especially designed for special education at a cost of one-half million dollars for site and structure.

2. Its dimensions are 318 ft. long x 190 ft. deep and is constructed in the shape of a capital "E."

3. The graceful lines, slate roof, and Indiana cut limestone front lend to its beauty and dignity.

4. All rooms are excellently lighted both with natural and artificial light.

5. The cafeteria is fully equipped for modern cooking.

6. There is an attractive library for all pupils of the school.

7. Eight class rooms for the lower grades are equipped with auxiliary industrial art shops.

8. The health suite consists of examining rooms, dental room, and office.

9. The model rooms for kindergarten and first grade pupils appeal to adults and children alike. Built between two class rooms, and with entrances from either, is a miniature house. The lower floor is an industrial arts shop and wardrobe, and contains a drinking fountain, lavatory, and toilets. The second floor is partitioned into two play rooms. Viewed from one class room this house presents an Old English front decorated with "Gingerbread," while from the other class room it has the front of a French house. A second equally beautiful and similar suite has a Spanish house on one side and a Colonial on the other.

10. The general shop for finding and exploratory courses is equipped for woodworking, mechanical drawing, clay modeling and firing, sheet metal work, electricity, household mechanics, and printing.

11. The gymnasium is spacious and well equipped.

III. Scope of Program

1. The school is divided into three departments. Two of these, the elementary and

junior high, were organized for normal children and include the greater percentage of the pupils enrolled. The third is a department of special education.

2. The school's program and its objectives are inclusive of the ideals set forth in the recent White House Conference on Child Health and Protection. Organized around and coördinated with the two departments for normal children is a department of special education designed to provide for all types of atypical children. This organization was developed to make an analysis of the mental, physical, and emotional status of the children, to eliminate or minimize their handicaps in so far as possible, and to assist them in the discovery of their respective interests and aptitudes.

IV. Special Rooms

1. Adjusted program classes are provided for those pupils who experience difficulty with the academic phases of the regular class work. Special attempt is made to discover their outstanding aptitudes and abilities. The curriculum is not merely an abbreviated form of that used for the rest of the school, but is definitely selected on the basis of its present and future value in the lives of these boys and girls.

2. Home environment and physical health of children are important factors in their mental health and consequent social adaptability. Pupils who are unable to adjust themselves to life in a sufficiently satisfactory manner are placed in social adjustment classes. The program is designed to correct the maladjustment and to get them back into the normal groups as quickly as possible. The value of the work is demonstrated in the finer qualities of citizenship acquired by these pupils.

3. The lowered vitality group are placed in open air classes. Anemic, underweight, and malnourished children form a large percentage of the enrollment. They are provided with rest, milk, cod liver oil, "sunshine" treatments, and suitable physical exercise. They work and rest in rooms that are always kept as nearly as possible at a temperature of 60°.

4. The orthopedic section of the special education department is the most extensive of any on account of the equipment and personnel required for its administration. The hydrotherapy room is equipped for warm water treatments, and whirl pool and brine baths. The warm water pool is kept at 95° Fahrenheit and is used for the reëducation of paralyzed muscles. The buoyancy of the water supports the child sufficiently to make exercise much easier, and the heat stimulates circulation and assists in relaxation. The use of the whirl pools is equivalent in effect to a general massage.

The psychology involved when children find that they can use their muscles in many ways that are new to them plays an important part in their progress.

5. Special lamps and bakers are used in the physiotherapy room for reëducation of muscles by heat and massage.

The physical therapy room is equipped with such apparatus as a punching bag, stall bars, spastic ladder, and mats. The room is used for corrective physical exercises.

6. The work in occupational therapy supplements that in physical therapy. The purpose is to provide therapeutic exercises that will be interesting and creative as well as remedial. It includes units in such work as sewing, weaving, cooking, clay modeling, typing, printing, wood work, and basketry.

7. Sunshine baths are furnished in a well equipped solarium. Reclining cots are arranged in a circle below the source of light. The light is radiated from four special carbon arcs suspended from the ceiling.

8. Proper eye hygiene and conservation of sight are the objectives of the sight-saving classes. Equipment used for this sort of work includes heavily outlined maps, 24 point text books, and special desks. To eliminate glare, the blackboard is tilted and the desks are of dull finish. No pictures nor anything including detail or likely to cause eye strain is used. Blind children and those whose vision is becoming worse, such as progressive myopia cases, will be taught to read braille.

9. Children who are so deaf that they are handicapped in attempting to carry on ordinary conversations are taught speech reading or visual hearing. Congenitally deaf children are, of course, taught to do the same and also to speak. Moving pictures and other special equipment are used to develop in them the ability to use properly the various organs of speech and produce sounds which they themselves have never heard.

10. Speech correction classes have been included for those with such defects as lisping, stuttering, stammering, and cleft palate.

11. Specially gifted children often find the ordinary school work very monotonous. As a rule, these pupils are capable of carrying a greatly enriched program with no more effort than is required of the ordinary child to do the work of the regular grades. Organized into major work groups these pupils can learn to do dramatic work in foreign languages, creative work in music and art, and elementary experiments in science at very early grade levels. They also learn to assume

an initiative and responsibility that are compatible with their natural endowments.

12. There has been formed a special reading group for those pupils who experience severe difficulties in reading, but whose abilities are not otherwise retarded. This work involves diagnoses of the particular difficulties and private tutoring and drill to overcome them.

W. K. KELLOGG FOUNDATION

"The permanent headquarters of the W. K. Kellogg Foundation, which Mr. Kellogg launched with a large sum of money, are located in Battle Creek.

"The purposes of the Foundation are directly or indirectly to become actively engaged in child welfare, to consider ways and means of helping in matters of child health, education, recreation, character building, and to influence school children so that health education may in turn penetrate the school, the home, and the community.

"The Foundation's activities are not limited to any country, race, creed, or religion, or are they to be confined within any geographical boundaries.

"At the present time the Foundation is intensely interested in the problem of the rural school. It is encouraging the consolidation of small country school districts and the establishment of central schools to include all classes and grades up to university entrance, where vocational training and health courses may be added to the curriculum so that the rural school child may have equal, if not greater, opportunity than the urban child.

"Another of the projects of the Foundation is to sponsor the physical and mental health programs in the Ann J. Kellogg School.

"The work of the Foundation is not only carried on in close coöperation with the local medical profession, but as far as possible the services of local physicians are utilized.

"The medical work at the Ann J. Kellogg School is under the supervision of an Advisory Board representing the W. K. Kellogg Foundation and the Board of Education. The members of the Advisory Board consist of:

Health Officer of the City of Battle Creek (Chairman)
President of the Calhoun County Medical Society
School Physician
General Chairman of Consulting Physicians whose services are used in the health program
Medical Director of the W. K. Kellogg Foundation
Local Representative of Crippled Children's Committee
Superintendent of the Battle Creek Public Schools
Principal of the Ann J. Kellogg School

PERSONNEL OF ANN J. KELLOGG SCHOOL

Administrative Staff
Principal
* Director of Pupil Placement
* Director of Health
Teachers
Elementary Department
Junior High Department
Special Education Department
Special Subjects
Special Personnel
Dentists
Visiting Teacher Nurse
Nurse
Physiotherapists
Occupational Therapist
Clerks
Dietitian
Librarian
Attendants
Bus Drivers
Maintenance
Engineer
Fireman
Janitors
Superintendent's Staff Giving Part Time Assistance
Director of Special Education
School Physician
Supervisors of Elementary Grades
Supervisor of Vocational Education
Supervisors of Industrial and Fine Arts
Supervisors of Music
Directors of Physical Education
Consultants and Directors of Clinics

This includes more than twenty specialists, representing local and state medical and dental organizations."

* Furnished by the W. K. Kellogg Foundation.

PUBLIC HEALTH NURSING*

When Nurses Speak in Public—Nurses need to realize that to be successful in public speaking they must be heard; otherwise the morale of their audience gradually wanes. Inability to be heard and lack of spontaneity often go together, and this is fatal.

Nowadays when a nurse is on some big program to speak she is requested to have her paper completed by a given date and forwarded to the committee. Busy as she is, with an intense effort she hurriedly completes it and sends it in, thankful that it is done. It would be better if she were allowed to send in a brief outline of her paper 3 months ahead, as an address should grow like Topsy; the ideas in it should expand and change as time and thought are spent on them. It pays to live intimately with one's subject, and a busy nurse has time to do this, dressing and undressing, waiting for a bus, going down town, or taking a walk. If the subject is allowed to ferment in the back of the mind often the stream of expression can scarcely be restrained. This is better than to sit at her desk and "torture her arid thoughts into a definite channel."

The chief objection to many papers read at nurses' meetings is that they do not arouse interest, stimulate curiosity, or make one think—they are not alive enough to make a dent in the placid surface of any mind.

Nurses are too afraid of changing their minds or expressing thoughts which are not in agreement with the conclusions of others, though they should know that change is essential to all growth.

After the outline of a paper there should be a rough draft to be analyzed as follows:

1. Is what has been written based on sufficient knowledge and study?
2. Is it honest in purpose and expression?
3. Is it animated by a desire to please or to conform to the opinion of others?
4. Does it express the meaning of its author?
5. Does it serve any useful purpose?—Is it helpful, instructive, stimulating, amusing, or interesting?

It helps a beginner to concentrate on arousing the interest of a bored looking person sitting on a back row directly in front of her. Some like to pick out a face showing kindly interest for the inspiration it gives.

It is a good thing for a nurse to be nervous for fear her address will be a failure. Complacency and assurance are not assets at all.—Mary E. Gladwin, R.N., Speaking in Public, *Am. J. Nurs.*, XXXI, 10: 1147–1152 (Oct.), 1931.

Nursing Problems Are World-Wide—There is a critical situation in nursing in the United States, in England, and in the Union of South Africa, but the situations are somewhat different. In England provincial hospitals are finding a shortage of properly qualified nurses to staff them; in the United States there is a great oversupply of nurses, many of them poorly qualified, while there are not enough well qualified public health nurses and instructors in nursing schools to go around; in the Union of South Africa there are not enough nursing schools to train an adequate supply of nurses.

Perhaps there is an underlying reason for these present acute nursing situations. In the 80's and 90's there were

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

few opportunities for young women of good cultural and social background and the new profession of nursing offered emotional satisfaction, opportunity for development and economic independence. Later hospitals increased and enlarged enormously and at the same time many other professions were opened to women. Hospitals continued to depend upon student nurses and continued the old militaristic system which served its purpose well when it was first laid down by Florence Nightingale.

An "Outsider," in the *Nursing Times* for October 17, says:

> At one time the nurses of the day were as a rule nuns, and these nuns in mediaeval times were quite willing to submit to the rigorous discipline imposed on them. They had taken vows by which they had renounced all worldly things, but those same vows are not required from nurses today and yet in many cases the same discipline prevails.

If one compares the lives of two 18-year old girls, one training for the teaching profession, the other for the nursing profession, he soon realizes some of the reasons why the better type girl would rather choose teaching. She has the time of her life in college; she works hard but she has her own latch key, uses the telephone whenever she likes, and takes part in student social activities. She has freedom to develop individuality. In the nursing school, as an "Outsider" expresses it, she "is expected to renounce her own individuality for the next few years and become a little machine, efficient, but devoid of feeling except where it concerns her patients."

An "Outsider" also says:

> There is probably no greater autocrat in the world than a hospital matron. She may not be outstanding in personality, education or social standing, but she can entirely forget the fact that she was once a probationer, and stand on a pedestal to which the whole nursing staff must look for several years.

Mary M. Roberts, editor of the *American Journal of Nursing*, in a letter to the *Nursing Times* of the same issue, says modern young women of high type in England and United States are not devoid of the spirit of service. Many able and educated women can be and are interested in the nursing profession, but they are not living in the Victorian era, so they want, as do all modern young women,

> Reasonable hours
> Adequate income
> Constructive leadership
> Opportunity for growth

We are quoting Miss Roberts as to the solution of the nursing situation:

> When schools of nursing are organized and supported as other professional schools are now supported—by taxation or philanthropy—when student nurses pay tuition (part of this might well be remitted for service rendered), when hospitals have hours of service comparable to the hours of work of other young women of good intelligence, education and social background, we shall have gone a long way toward solving the problem of securing adequate, intelligent and sympathetic nursing service for our patients.

REFERENCES

An Outsider. The Shortage of Nurses, *Nursing Times*, 1381: 1118 (Oct. 17), 1931.

Roberts, Mary M. American Views on the Shortage of Nurses, *Nursing Times*, 1381: 1120–1123 (Oct. 17), 1931.

Serious Shortage of Nurses, *South African Nursing Record*, XVIII, 9: 245 (June), 1931.

About Public Health Nursing Associations in Connecticut—The Bureau of Public Health Nursing of the Connecticut State Department of Health has recently made a study of 83 public health nursing associations in Connecticut. The following are some of the data found under the headings of the different services included in the program:

1. *Maternity*
   All associations give some prenatal care. In 5 associations, urinalysis and blood pressure readings are routinely made at the time of the visits. In 4 associations, urinalyses only are done.

   Delivery Service
   48 give this service

14 give the service only in emergency
21 do not give the service at all

2. *Tuberculosis*

There are only 2 associations in the state which do not include tuberculosis nursing as part of the generalized program. This is explained by the fact that there are special facilities in these towns for the care of such cases.

3. *School*

Of 93 generalized associations in the state, 50 include school nursing in the program and 43 do not. School nursing is a specialized activity in 38 of these 43 associations, 16 being in large cities and the remaining 22 in towns ranging in population from 1,880 to 18,740.

4. *Hourly Nursing*

There are 16 associations giving hourly service.

5. *Clinics held* (Continuously)—

Dental	by 25	associations
Mental	by 5	"
Tuberculosis	by 9	"
Prenatal	by 5	"
Immunization—		
Diphtheria	by 2	"
Eye Clinics	by 1	"
Tonsil and Adenoid	by 1	"

6. *Conferences:*

Child Hygiene	by 62	associations
Mothers' Clubs	held by 8	associations
First Aid Classes	" " 23	"
Home Hygiene and Care of the Sick	" " 13	"
Posture Classes	" " 4	"
Summer Camps	" " 1	"
Social Service Committees on Board	" " 9	"

—(This information was obtained several months ago and is probably less than the number at the present time.)

7. *Clubs and Classes:*

8. *Charges made for services:*

Charges vary from $.50 to $1.25.
6 associations charge $.50.
20 charge $.75.
$1.00 is the most common fee asked.

9. *Cost of nursing visit:*

The cost varies from $.75 to $2.80, the high cost indicating fewer nursing visits and more health education activities, social work and clinic services. The average cost is between $1.00 and $1.50.—

Information on Local Services, *Pub. Health Nurs. Bull.*, Connecticut State Department of Health: 5–6 (Nov.), 1931.

EDUCATION AND PUBLICITY*

WHEN communities come to learn the fact, which is a fact, that a large proportion of the ills of mankind are in their nature preventable, and by due observance of hygienic laws may be prevented; then will the responsibilities of " Boards of Health " be fully appreciated, their acts sustained by public approval, and the fullest practical advantages flow from them.

When the public come to comprehend our true official character, as in time they will, we shall be expected not only to supervise, and, when possible, direct in matters affecting public health, but also to become a source of information in regard to everything connected with the physical well-being of our fellow citizens.—Dr. C. A. Lindsley in his first report as Health Officer in New Haven—a half century ago (1881).

Education Versus Service—A comparison of smallpox and diphtheria vaccinations obtained by service of school physicians in the schools of Cleveland, and by education of parents as practised in Detroit, is reported in a brief paper by O. P. Kimball, M.D., Board of Education, Cleveland.

Dr. Kimball concludes that—

As much or more is being accomplished in Detroit than in Cleveland. True, the school physicians themselves are not doing the work, but the parents are having it done. The school physician, nurses and teachers have been teaching health at every school contact to the effect that pupils and parents are gradually accepting the principle that this important business of future health is their responsibility; and because of this, more work is actually being done.

This comparative study was not made with the idea of criticizing the medical work in any school system. It was made solely for the purpose of estimating the results in terms of preventive medicine, of two totally different systems: Health education and medical welfare as school services.

I feel sure that any community will respond to the principles of health education as Detroit has done. And, what seems very important, the parents and pupils will have the knowledge and experience of taking care of themselves. Also, in so doing they maintain a greater self respect.

The school nurse of the future will be a teacher of health. Instead of dragging a group of children in to have their teeth cleaned and a few extracted she will be teaching them how to keep their teeth clean and how to make use of the facilities which the community offers. Instead of spending twenty minutes scrubbing and cleaning a dirty little face with impetiginous infection, she will do the bigger and better job of taking the child home and teaching mother and child what they should do about this condition.—

Health Education in Two Cities. *Pub. Health Nurs.*, 450 7th Ave., New York, Nov., 1931. *25 cents.*

Three Thanksgiving Days—Dr. John L. Rice presented to New Haven the " makings " of a notable Thanksgiving Day celebration. The November, 1931, issue of *Health,* New Haven Department of Health, was a comparative study of health conditions in that city in 1881, 1931 *and* 1981. The cover page carried " Thanksgiving " and the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

three dates. A group of mortality figures for 1881 were contrasted with those of 1931—with blank spaces for 1981.

A page of short paragraphs on conditions in 1881 was set off by similar paragraphs concerning 1931. Dr. Howard W. Haggard compares 50 years ago with the present, and Prof. C.-E. A. Winslow pictures 50 years hence.

Plenty of white space. No diagrams or illustrations. Several silhouettes might have enlivened the pages, and would go well with the paper.

A good form of comparative reporting for other city departments—at any time of the year. *Sample free to any health officer.*

1932 Awards of Merit—Health materials for publicity, interpretation, or health education, whichever it is or whatever you call it, will be considered by the Awards Committee of the Social Work Publicity Council.

Press stories, photographs, posters, letters, all types of printed matter, mimeographed matter, annual reports, slides, film strips, photographs and descriptions of exhibits or activities, or what?

Send to the editor of "Education and Publicity," to address on the first page of this department every month.

There will be no prizes, but the features of significance will be selected and announced in May, 1932. Send entries now, and more later.

Digging into the Past—Elsewhere in this issue is recorded health wisdom dug up by New Haven.

In New Jersey's *Public Health News* is told how "Morristown Citizens Were Given Sound Advice 55 Years Ago" (State Dept. of Health. Sept.–Oct., 1931).

According to a Racine newspaper,

> Twenty years ago, the Health Department released to the press a story about 17 cases of diphtheria occurring in the month of October and added the comment that no epidemic was threatened. At that time, the official population of Racine was 38,000.
>
> The coincidence comes in the fact that the first 10 months of 1931 have witnessed the occurrence of 17 cases of diphtheria in Racine, which is exactly the same number as those reported in 1 month 20 years ago. Moreover, the population is now 68,000, thus making the ratio practically 19 to 1.

Departmental reports and files, and local newspapers in other communities may yield statements, incidents or facts, interesting and stimulating in the present day.

The Advertiser and the Schools—The organizations seeking wider educational use of broadcasting are stimulating much discussion of the "sponsored program" in relation to the classroom. One center for this discussion is the National Committee on Education by Radio, 1201 16th St., N. W., Washington, which issues a semi-monthly *Education By Radio*. Copies *free*. In "Advertising Invades the Schools" (Sept. 10, 1931) is the following taken from the 1931 report of the California Commission for the Study of Educational Problems:

> Radio advertising invades schools—It has always been a fundamental principle of American education that the schools must protect their children from exploitation; that no interest shall be permitted directly or indirectly to advertise in the classroom. The commission regrets to report that this principle is being flagrantly violated in many California schools and that the regular work of the children is being interrupted, largely because modern methods of advertising have insinuated themselves into the school system.
>
> By donating to the public schools fine radio and motion picture programs, and cleverly enlisting support therefor from teachers, parents, and school officials, a number of California business firms today are inducing the schools to grant them advertising time in the schoolroom. The commission is unable to see any practical difference between printing the words "Brown and Company are good merchants" on the blackboard and permitting the words "Brown and Company are making you chil-

dren a present of this fine program" to be spoken repeatedly in the classroom or to be flashed upon a motion picture screen.

The admission into the schoolroom during school hours of radio and film programs carrying "good will" publicity establishes precedents which naturally lead other firms to try to gain admission for their own advertising. Granting one firm such a privilege while denying it to others confers an unfair trade advantage.

An interesting example is a well printed 6-page folder on Foods For Growing Boys and Girls issued by a state tuberculosis association. At the foot of the last page appears "Courtesy of . . . ," naming a food manufacturer. Not a line in the text emphasizes the uses of cereals or otherwise promotes that food business. The "food chart" gives less space to cereals than to fruits and vegetables. It does include some of the trade names for cereals. Send 2 cents to Michigan Tuberculosis Association, Lansing, if a copy is desired.

Recently among the free material displayed by one of the most influential health agencies in New York was a folder containing a recommendation disapproved by the great body of health workers.

What precautions should be taken?
What lines should be drawn?
What encouragement should be given to commercial interests?

Trouble News Invited—"Troubles," problems, unsolved questions as to the future development of health education—whatever you have on your mind—may well be told to Chairman Galdston or any member of the Section Council. Early in January the usual mid-year meeting of the Council will be held to plan the 1932 program. Suggestions from the floor will be most welcome.

High Tide at Montreal—The attendance of those concerned with health education, the nature of the program, the use made of education and publicity headquarters, and the intensity of interest in the development of health education and the functioning of the Section made a most gratifying combination.

We look forward to an even better time at Washington in 1932.

Selecting Topics for a Conference or Convention—An outline on this subject has been prepared for discussion by program committees who wish to study the theory and technic of making up successful programs. The outline is also being used by some program committees as a check against the plans they are making. *Copies free* from editor of this department.

Convincingly But Not Positively—F. P. A., in *New York Herald-Tribune*, unconsciously pictures a frequent difficulty of writers on health subjects:

Most of us were told that Mr. William Gillette's 1929 appearances as Sherlock Holmes constituted his farewell tour. And now, the day after Christmas, he will begin a farewell tour. And that, gentlemen, reminds us of the fellow who crashed the No Admittance sign. "Hey, what's the idea? Can't you read?" "Sure, but it don't say '*Positively.*'"

The difficult art of being convincing when we cannot be as positive as, say, the patent medicine men!

The Doctors Do It—The official health examination campaign of Greater New York physicians is on a sound continuing basis.

The health examination idea is, as every physician knows, nothing peculiarly new. Fifty years ago the subject was proposed to organized medicine through resolutions at medical society meetings. Ten years ago the Committee on Public Health of the Medical Society of the County of Kings discussed the matter and in 1925 examined 91 of the members of the society. In 1926 the committee issued a Report of its experiences and Chapter V of that report was entitled "Records, Equipment and Follow-up." *The Health Examiner* in the present issue reprints this

chapter which reflects the consensus of opinion of the group examined and the examiners.

The above is from *The Medical Examiner*, the 24-page, miniature magazine, issued by The Greater New York Committee on Health Examination, 2 East 103d St., New York. *10 cents; $1.00 a year.*

The committee has issued a new leaflet to be placed on waiting room tables for patients to read and take with them. Cards with the following copy, in script type, have been issued.

In the interest of continued good health you are urged to visit your physician for a health examination at regular intervals.

This measure of preventive medicine and personal health service is endorsed by the Five County Medical Societies of New York and the New York Academy of Medicine.

Engraved cards are supplied at *2 cents* each; printed cards and leaflets are free—in Greater New York. *Samples free.*

Neither Distinction Nor Difference—Probably the health worker who issued the statement below used the words we have italicized only to emphasize the significance of the exhibit, and did not mean to imply a distinction between "impressing the public mind" and doing an "educational" job.

It is not only for the purpose of *impressing the public mind* with the menace to health of impure air and dirty streets that an exhibit will be held . . . but it is being arranged primarily as an *educational measure* to stress the possibility of preventing this nuisance as well as health hazard.

Is Mental Hygiene Oversold?—"When the public wants something as badly as it seems to want mental hygiene, it is probably going to get it in some form or other. The task of the organized mental hygiene movement is to look that fact in the face and to deal with it as best it can," says Stanley P. Davies in "The Public Mind on the Private Mind." This is the sub-title of "Education of the Public on Mental Hygiene," a paper presented before the Educational Publicity Division, National Conference of Social Work.

The paper reviews the comments of psychiatrists and others that mental hygiene has been oversold. They believe that a demand has been created out of all proportion to the extent to which it is possible to deliver the services of properly trained psychiatrists, of psychologists and psychiatric social workers of clinics and other services.

Those who believe that mental hygiene is oversold in this sense fear that the creation of a demand, before proper facilities exist to meet that demand, invites not only the development of misguided, half baked even though well intentioned, ventures in mental hygiene, but also opens a wide field for quacks and charlatans who are only too ready to exploit all possibilities. Such a situation as they see might be compared to the widespread national advertising of a highly desirable commodity, the production of which is, however, so limited that the genuine article is on sale in very few places, and with people elsewhere so convinced, through effective advertising of their great need of that commodity, that they are being sold inferior substitutes or entirely spurious articles.

After reviewing thoughtfully both sides of this program of over selling service Mr. Davies nevertheless comes to the conclusion:

The field of greatest opportunity for educational and publicity work in mental hygiene lies wide open. Mental hygiene, real mental hygiene, has not been oversold. Mental hygiene means not mental disease, but mental health. It is primarily concerned with the normal, not with the abnormal. It is, or should be, positive not negative in its approach.

Just what this positive approach would be is described and illustrated at length in a most helpful way. That editors recognize a need for this thor-

ough analysis of the problem of mental hygiene propaganda is indicated by the number of sources listed below for obtaining the paper.

In *Proceedings of National Conference of Social Work*—1931. University of Chicago Press, 5750 Ellis Ave., Chicago. *$3.00.* In *Mental Hygiene,* 450 7th Ave., New York. Jan., 1932. *$1.25.* Reprint, *15 cents.* In brief form, "What Grown Ups Cry For." *Survey Graphic,* 112 E. 19th St., New York. Dec., 1931. *30 cents.*

Publicity by the County Nurse—Several publicity or interpretation items are included in a suggested program of work for the county nurse issued by the Division of Public Health Nursing, New York State Department of Health.

The nurse may expect for her committee immediately upon her arrival (among other items listed): Suitable and sufficient publicity regarding her arrival.

Here is an opportunity for the state department or the state tuberculosis association, whichever is most directly concerned, to serve both the local committee and the new nurse. The local committee may not know what to say in print when the county has a nurse for the first time, or to reëxplain the service when a new nurse arrives. And what shall they say about the nurse herself? Does the state health agency supply the local committee copy to be used in the newspapers?

Where the territory covers a county or more than one community the formation of local committees will be very helpful in various ways (among others): To disseminate accurate information in the community regarding the nurse's work in general and regarding the details of new work to be developed.

But does the committee know what to "disseminate," and how? Does the nurse know?

Does the state office send to the committee or to the nurse copies of good news stories from other communities, as examples? Or offer ready-made stories now and then to be adapted locally? Or tell of reading references that will help in the job of "dissemination"?

Under "Aids in Systematizing Rural Work" are suggestions for zoning the county and making a schedule of visiting periods.

Have this schedule printed or mimeographed for distribution to doctors and supervisors, for posting in appropriate places throughout the district, and for publication in the newspapers.

For the newly trained nurse or even one of some experience, the above simple suggestion immediately raises a row of barriers to be hurdled.

What should be said in introducing and explaining the zone schedule? Does that suggestion call for one or two or three forms of the schedule for the three uses? Just how should a zone or community schedule be put down on paper in a form easy for the nurse, and practicable for use by those who are to use it?

Absurd questions? Then try it out yourself, and then imagine the newly-made county nurse who has had no experience in explaining herself and her job, and has never had mimeographing or printing done, or has never "put anything into the newspaper."

Is there any place for her to write for samples? Will the state department or state association send her a model form or specimens of what other nurses have done?

The county nurse is but one among the health workers who come up sharply against brand new chores in promotion and interpretation. What is being done to help them? What more might be done?

MAGAZINE ARTICLES

To be quoted; to be commended; to be questioned—if need be.

"The Airplane Germ Peril." *Literary Digest.* Nov. 4, 1931. Based on *Lancet* article.

"The By-Products of an Accident." *Literary Digest.* Nov. 28, 1931. Based on *National Safety News* article.

"The Doctor Looks at Medicine." *Nation.* Nov. 4, 1931. Cost of medical care.

"The First Fifty Years," by C. W. Lieb, M.D. *Collier's.* Dec. 12, 1931. "Don't work too hard!"

"The Frost on the Baby Crop." *Literary Digest.* Nov. 28, 1931. Infant mortality. Based on *Good Health* article.

"Keeping Children Well in Winter," by W. R. Ramsey, M.D. *Farmer's Wife,* St. Paul. Dec., 1931.

"Noisy Ambulances." *Literary Digest.* Nov. 14, 1931. Based on *New York Times* article.

Manuscript for rural readers will be welcome to Health Editor, *Farmer's Wife,* St. Paul.

When you have a specially good press release, or article in your house organ it may get into *Literary Digest* if sent to the editor in New York City.

UNEMPLOYMENT

"Writer Warns of Glaring Errors in Articles for Food Pages," by L. H. Milliman. *Editor and Publisher,* Times Bldg., New York. Nov. 28, 1931. *10 cents.* Detailed analysis to show "How to Live on Ten Cents a Day Features" often built on imagination and poor arithmetic.

"Emergency Nutrition," by Henry C. Sherman. *Child Health Bulletin,* 450 7th Ave., New York. Nov., 1931. *Free.* How to spend the food money.

Economizing Safely. Leaflet by Connecticut State Dept. of Health, Hartford.

They Proved It: Dairy Products the Basis of an Adequate Economical Diet. 6 pp. National Dairy Council. *Free.*

The American Social Hygiene Assn., 450 7th Ave., has outlined specific needs in the social hygiene field growing out of depression conditions. *Free.* Also in *Bulletin,* Massachusetts Society for Social Hygiene, Little Bldg., Boston. Nov., 1931.

"Tuberculosis Is Never Unemployed." *Crusader,* Wisconsin Anti-Tuberculosis Assn., Milwaukee. Dec., 1931. Why tuberculosis work must go on.

"Dairy Products in the Adequate Low-Cost Diet." *Dairy Council Digest,* National Dairy Council, 221 N. LaSalle St., Chicago. Nov., 1931. *Free.*

"The Second Winter." *Pittsburgh's Health,* Dept. of Public Health. Nov., 1931. Disease usually accompanies extreme depression; worry is dangerous; the emergency must be met.

"Stalwart Citizens" (who are in need), and "They Must Be Helped." *Health,* New Haven Dept. of Health. Oct., 1931. Appeals for Community Chest support.

Principles and policies on administration of relief are outlined by President's Organization on Unemployment Relief, 1734 New York Ave., Washington. *Free.*

NEW

Better Times, now published by the Welfare Council, 122 East 22d St., New York, appears in a brand new dress, about 8" by 11" in size. Weekly bulletin issues; 4 magazine issues a year. For those who wish news of health and welfare activities in New York City. *Samples free.*

White House Conference Happenings, Interior Bldg., Washington. *Free.* Follow-up activities; "scope and status of publications"—past and to come.

The Provincial Dept. of Health, British Columbia, started a *Health Bulletin* in September.

BOOKS AND REPORTS

The Great Physician. A Short Life of Sir William Osler—*By Edith Gettings Reid. New York: Oxford University Press,* 1931. Price, $3.50.

This is the story of a man rather than a physician. We meet the man, but are told about the physician. The book is one long eulogium. In that sense it is extremely discouraging to mere mortals. Had Dr. Osler been permitted the luxury of a single weakness, or had not some of what may have been weaknesses been rationalized into nobilities, the book would be more of an inspiration. In speaking of Dr. Osler's numerous biographical essays the writer remarks:

> His essays are not characterizations; they are idealizations of what was best in his subject, of what the man might be, not exactly what he was. . . . You are left with a somewhat exaggerated idea of the virtues of his subject.

Can the author of the present work then be censured for following in this respect the example of one for whom she has such obvious admiration?

Regardless of any one-sidedness it may have, the book makes extremely interesting reading. There is a vividness of presentation which is remarkable, though the degree is not uniform. We meet Dr. Osler at his table; we romp with him in the nursery; we enthuse with him over a rare edition added to the library; we accompany him to the sick room; but, while we may look into his laboratory or his clinic, we do it as through a glass door. We are informed that he is busy. We may even enjoy the courtesy of being informed as to what he is doing, but to get back into personal contact, to renew the bonds of fellowship, we must wait and rejoin him as he emerges.

This work will doubtless delight the many friends of Dr. Osler in this country and abroad. Few men had the gift of making friends to the extent possessed by him. A vast number of younger men cherish the remembrance of his geniality and aid.

The book is beautifully printed.

MAZŸCK P. RAVENEL

School Ventilation—Principles and Practices—*Final Contribution of the New York Commission on Ventilation, New York: Bureau of Publications, Teacher's College, Columbia University,* 1931. 67 pp. Price, $1.00.

The appearance of this "final contribution" presumably marks the end of the reincarnated New York Commission on Ventilation, which engaged in studies of the effects of various types of school ventilation, from 1926 to 1929. This report is certainly not the "final" word on this much discussed and highly controversial subject and as a "contribution," it can be judged only from the standpoint of its value in clearing away certain earlier errors and misconceptions concerning both the principles and the practices of school ventilation.

Both the proponents and the adversaries of the commission will be interested to learn that its members now admit, as a result of the recent studies, that ". . . *the general uniformity of results,* with varying air flow and with unit ventilation and window inlets, *raises serious doubts as to the earlier conclusions obtained* (*sic*) *by us in 1923.* . . ." In our own earlier work ". . . *the superiority of window gravity*

ventilation was based on differences in respiratory illness in attendance obtained by methods which we now know were inadequately safeguarded." Of equal interest will be the statement that ". . . slight differences in room temperature, deviating only 2° or 3° above or below *70°, do not exert a measureable influence upon the respiratory disease incidence. This contradicts our own earlier conclusions* . . ." (p. 41).

And of the utmost importance is the admission of the fact that "*Our earlier view that window gravity ventilation is definitely superior to plenum ventilation from the standpoint of the liability to respiratory infections must apparently be abandoned* . . ." (p. 48). (Italics T. J. D.)

Furthermore, there is absolutely nothing in the text to justify the implication on the paper jacket of the book, and the definite statement in the newspaper release that announced its publication, that systems of mechanical ventilation are *per se* a menace to the health of the pupils. In fact, on page 41, it is stated that "it makes no difference to the health of the pupils . . . whether this air is provided by a plenum fan, a unit ventilator, or a window inlet" and, on page 66, we are told that "*Desirable* air conditions may be obtained . . . (*a*) by plenum ventilation; (*b*) by local unit ventilation; (*c*) by by window-gravity ventilation," while on page 54, fan ventilation is even recommended "In certain schools where outdoor noise or dust or odors may make it inadvisable to keep the windows open. . . ."

The above statements indicate what scientific investigation actually reveals, namely, that there is nothing inherent in mechanical forms of ventilation inimical to the health of the pupils, and why the commission should, in face of these facts, label it a menace with one breath and approve or recommend it in the next is incomprehensible. It is the condition of the air in the classroom that is important, not the means by which the condition is obtained or maintained, and it is well-known that debilitating and dangerous overheating may occur with any system of school ventilation that is not intelligently operated.

While the above confessions of error will partially purge the souls of certain members of the commission, they will no doubt cause embarrassment to certain organizations and groups which placed their respective stamps of approval on the earlier conclusions of this august body.

With so much recantation, it will perhaps be a source of wonder that the members of the commission try still to maintain "that both respiratory-illness-absence and respiratory-illness-inattendance may be used as satisfactory and reliable measures of the health of the pupils . . ." when the absence of objective diagnostic standards for certain respiratory illnesses is so widely deplored, and when, as Greenwood has it, there is certainly no "unambiguous relation" between classroom air conditions and the so-called minor affections of the respiratory tract. The commission is in possession of facts, not published in this book, regarding the inability of various observers—teachers, nurses, and physicians—to agree on diagnoses; facts that do not lend the slightest support to this thesis.

It is also difficult to explain on any ground but bias, why this quasi-medical group, seeing all reasons therefor on the ground of healthfulness shattered, steps out of its rôle and continues to advocate window-gravity ventilation on economic grounds—grounds as uncertain as were the previously advanced (and now admitted—erroneous) ideas of health. It is indeed unfortunate that the whole subject could not have been considered dispassionately and scientifically, free from the influence of preconceived notions that have colored the conclusions.

For the student of the science, as for the practitioner of the art, this little volume, with its ambiguities, inconsistencies and contradictions, will be a wholly inadequate and unsatisfactory guide to the principles and practices of school ventilation.

THOMAS J. DUFFIELD

Jurisprudence for Nurses—*By Carl Scheffel, Ph.B., M.D., LL.B. New York: Lakeside Publishing Co.*, 1931. 166 pp. Price, $2.00.

Every practising nurse is dogged by the law and it behooves her, therefore, to know something about the legal rights and responsibilities of her profession. This practical book supplies the information in a concise and useful form. It deals with such subjects as the legal status of nurses, their legal obligations, their relationship to contracts and wills, and their criminal responsibilities.

Topics such as these are as essential to the education of a nurse as is a knowledge of bacteriology or chemistry. The application of these facts should serve to prevent litigation and promote efficiency in the business and professional relationships of nurses. The book is well printed, has a good index, and contains lesson quizzes at the end of each chapter. It should be indispensable to all practitioners of nursing, especially since it is the only text of its kind.

JAMES A. TOBEY

Handwashing in Schools—*Report of a study made by Cleanliness Institute, New York, N. Y.*

The object of this study was to determine the extent to which the 26 million school children in the United States are having a chance to practice handwashing at school. Data were gathered from a representative group of 145 schools (124,088 pupils) of every type, geographically distributed in 15 states scattered throughout the country, and with widely varying forms of organization. Findings include information regarding the presence of adequate equipment (hot and cold water, soap and drying facilities in sufficient amounts), its location, and the type of school organization (interest of teachers and administrators, provision of time for handwashing under supervision, and care of equipment). In the majority of the schools studied, equipment was found to be inadequate, but in every case more efficient organization would have made its use more effective.

In addition, through the coöperation of 21 manufacturers, and other companies, an intensive study of various types of handwashing in actual use was made in 8 of the schools in Newton, Mass. This investigation demonstrated the practicability of different types of equipment, and gave data on time, water, and soap consumption per 100 handwashings under varying circumstances and in different locations.

Facts and figures are clearly arranged, and the inquiry has materially advanced our knowledge concerning handwashing among the school children of the United States.

RUTH I. PARSONS

The Conquest of Old Age. Methods to Effect Rejuvenation and to Increase Functional Activity—*By Peter Schmidt, M.D. New York: Dutton*, 1931. 307 pp. Price, $5.00.

This book is a defense of the Steinach operation, the author having been a disciple of Steinach.

The first part of the book, devoted to endocrinology, is sound and interesting, and the author gives a number of case histories backed up by photographs "before and after" which almost force conviction. Unfortunately the book is addressed to laymen as well as doctors and we have already had too much evidence that this is a dangerous matter to bring before the public. One point

in which we thoroughly agree with the author is his statement in the preface that he hopes "to do away with the stigma of the ludicrous which has hitherto attached to the physiologist in the laboratory and to the clinician in his daily practice as far as attempts at rejuvenation are concerned."

It is interesting to know that the author committed suicide, in spite of his firm belief in the possibility of rejuvenation. The book is unfortunately marred by attacks on physicians which accuse them of prejudice, obtuseness and self-interest which leads them to distortion of facts and unfairness.

The book can be commended to those who know enough of medicine to judge properly of its worth, but not to the public. The make-up is excellent.

MAZŸCK P. RAVENEL

Kansas City Health and Hospital Survey—*Prepared by The Committee on Administrative Practice of The American Public Health Association and the Kansas City Public Service Institute. Made under the direction of the Committee on Public Health and Welfare of the Chamber of Commerce of Kansas City, February, 1931.* 329 pp. Price, $2.00.

Where complex factors are involved, the first step toward betterment is a study of existing conditions. Such a preliminary study is essential where public health is concerned; public health has so many social, industrial, economic, and individual factors that an extensive program of betterment will fail unless those who propose it have prepared the way by finding out what is actually being done, by studying the opportunities for betterment, and by securing in advance the adherence of an interested body of opinion. This procedure seems to have marked the Kansas City Health and Hospital Survey.

In general the survey gives evidence of being carefully made, and it is liberally provided with illustrative figures and charts. It is easy to read because of the literary presentation of its material and the excellent work of the printer.

This journal has an especial interest in certain matters presented. The chapter headings, Maternal and School Hygiene, Public Health Nursing, Industrial Hygiene, and Popular Health Education, suggest possibilities not always fully appreciated and certainly only partially attacked. The Kansas City report does not touch on the possibilities of mental hygiene activities in these fields. It remarks that there is no nursing service for mental hygiene. Special classes for mental defectives are noted. For over a dozen years Kansas City has maintained a psychological laboratory where studies are made on the difficulties of backward children.

More is said about other matters and there is a chapter on mental hygiene. The inadequacy in conception and in administration of the city's provision for the mentally ill is commented on and hope expressed for something better. Apparently little improvement has occurred in these facilities since the Missouri Survey over a decade ago. Where a municipality is negligent in such matters, the influence of the state should inform and correct public opinion about the matter. But the philanthropic and socially minded of Missouri are still struggling with the problem of making the activities of the state anywhere nearly adequate to the needs so that no pressure on municipalities may be expected from that source for many years. Perhaps the colored mental patients are even less well cared for than the white.

It is possible that there will again be in Kansas City a medical school operated and supported by the Commonwealth. If this be so, we hope that the policy of German university cities may be followed, and that the psychopathic hospital may be part of the university

hospital group, under the direction of the professor of psychiatry, operated for the benefit of all persons in the community who fall ill of mental disorders, and at the same time used as a teaching center. Then physicians who go out from the school of medicine will carry an adequate understanding of disorders that affect the mode of behavior and the body of belief of the individual, and a suitable knowledge of how to treat them and where to refer those who need more special care.

Time was when a health survey might not include the field of mental hygiene, but now this topic is sure to receive thoughtful attention. A careful study will in time be followed by appropriate action. S. W. HAMILTON

General Bacteriology—*By Edwin O. Jordan, Ph.D. (10th ed. rev.) Philadelphia: Saunders,* 1931. 819 pp. Price, $6.00.

This has been a standard text since 1908, when the first edition appeared. It has now reached the tenth edition, and in the meantime has undergone a number of revisions and many reprints, a history which proves that it has won its way on its merits.

The size of the present volume has been increased by some 40 pages. The chief changes are in the sections on variation, undulant fever, the paratyphoid group, the filterable virus diseases, the pathogenic yeasts, and the anaerobes. A number of new and good illustrations have been added.

We cannot but commend the author for his treatment of Nomenclature. He has used "tentatively" some of the newer suggested generic names, although he holds, we believe correctly, that the names of bacteria will continue to be ruled by convenience until a general and rational system can be worked out by international agreement.

It seems supererogatory to commend a volume which has attained such a firm position in the literature of bacteriology. We can only say that this latest edition upholds the standards set by the first and those which have succeeded each other in the meantime.

The printing and make-up are excellent. MAZŸCK P. RAVENEL

Industrial Accident Prevention, A Scientific Approach—*By H. W. Heinrich. New York: McGraw-Hill,* 1931. 366 pp. Price, $4.00.

This work is one of the publisher's series of insurance manuals and is especially designed for industrial executives and safety engineers.

It is based upon 17 years' experience with the engineering and inspection division of the Travelers Insurance Company and the accident publications which have appeared from time to time from that company are incorporated herewith. It is the author's contention that science may be applied practically and successfully to the prevention of accidents, using the term "science" in the sense of knowledge of principles or facts. The principles laid down have been applied so extensively that they indicate beyond a doubt their practicability and effectiveness.

All the essential principles are discussed in the first chapter, the remaining chapters simply developing various phases of the subject. Method is stressed more than detail, on the theory that, if it be properly selected and applied, satisfactory results must eventually follow. The chief danger at present is in assuming that industry is already well enough acquainted with the principles and now applies them effectively in practice.

The four fundamental principles of accident prevention are executive interest and support, cause-analysis, selection and application of remedy, and executive enforcement of corrective practices. Nearly 100 pages are devoted to guarding—practically all of the 150-odd il-

lustrations falling within this chapter. Eleven appendixes, comprising some 85 pages in smaller type and numerous tables, amplify the text.

The subject matter is comprehensive, well assembled, spiced with numerous case citations and experiences, and constantly emphasizes the necessity for determining the hazards for the given individual rather than general or mass hazards, which seems reasonable. A brief bibliography accompanies. The type, general get-up and printer's art are in keeping with the usual excellency of this well known publishing house.

EMERY R. HAYHURST

The Community and Social Welfare—*By Cecil Clare North. New York: McGraw-Hill,* 1931. 359 pp. Price, $3.50.

Too often our public health programs, particularly when they are planned by state or national executives, ignore the fundamental fact that an effective program must be a community program, designed not only to fit the public health needs of the particular community but also taking cognizance of the other local social problems and machinery.

This study of community organizations is useful to the public health worker not so much for the chapter on a program for health, in which there is little if anything which will be new to him, as it is for its rather complete and attractive presentation of the whole community problem to which the health program must be adjusted.

The discussion of public and private agencies is particularly pertinent to the public health field and the soundness of the viewpoint is indicated in the comment:

> The consensus of informed opinion everywhere has been that the system of public subsidies to private agencies is a pernicious one; and that the greater progress toward satisfactory public administration will be secured by retaining the expenditure of all public funds in the hands of public officials and developing in private agencies the independent position that comes from raising their own funds.

HOMER N. CALVER

Dietary Suggestions—*By C. D. Christie, M.D., A. J. Beams, M.D., and E. M. Geraghty. Chicago: American Medical Association,* 1931. 156 pp.

Books on dietetics have generally been prepared either for the more or less normal person or for the individual who is hospitalized. This one differs from most others in that it is intended for the "vertical patient." It discusses diets suitable for constipation, gastric disturbances, and diabetes, and also high caloric, low protein and reducing diets. In each instance there are offered many practical recipes which the physician may prescribe for the ambulant patient in need of such diets.

All of the valuable material now conveniently assembled in this well printed little book appeared during 1930 in the *Journal of the American Medical Association,* and *Hygeia.* Dr. Beams collaborates with Miss Geraghty in 5 of the 7 chapters, while Dr. Christie is credited as co-author of the section on diabetes only. As Dr. Morris Fishbein states in a brief introduction, this useful book should meet with a wide and favorable reception.

JAMES A. TOBEY

Abstract of Literature on the Production, Processing and Distribution of Fresh Milk. *Vol. I. Chicago: International Association of Milk Dealers,* 1931.

We have received from the Executive Secretary of the International Association of Milk Dealers the above mentioned volume of abstracts. The work has been done under the sponsorship of the Committee on Laboratory Methods of the association.

The abstracts cover the literature in practically all fields and departments of the fresh milk industry, including production, processing, quality control, and

distribution. For each the name of the original author and its source of publication are given.

The work has been well done and doubtless will furnish to milk producers much material which will aid them and be of benefit in improving the quality of the supply. MAZŸCK P. RAVENEL

The History of Paediatrics—the Progress of the Study of Diseases of Children up to the End of the XVIII Century—*By George Frederick Still, M.D. (Cantab.), Hon. LL.D. (Edin.), F.R.C.P. (London). New York: Oxford University Press,* 1931. 526 pp. Price, $8.00.

Dr. Still has upheld the reputation of the scholarly Englishmen in his choice of diction and careful selection of historical material with which he traces the evolution of pediatric thought from the 4th century before Christ to the end of the 18th century. This absorbing volume supplements and extends the excellent biographical and historical material already published by Caulfield, Garrison, Ruhrah, Sudhoff, and Foote.

It is a delight to be guided through the mazes of thought concerning childhood diseases by one who has so thoroughly sifted and so logically arranged his material. While they are presented in chronological order, the biographical sketches are interwoven to present a continuous story. First of all, one turns naturally to the early history of infant feeding, the difficulties encountered, and the solutions offered. The earliest descriptions of diphtheria and rickets will bear careful reading today. The chapter on the first children's dispensary in England is replete with personal incidents in the life of George Armstrong, its founder. That "George Armstrong deserves an important niche, not only in the history of paediatrics, but in the history of social welfare" is convincingly shown.

The volume is made more interesting by the facsimile reproductions of the title pages of a number of the classics in medicine. Full page portraits of the pioneers in pediatrics add much to the volume. RICHARD A. BOLT

Some Biting Remarks—*By Happy Goldsmith. New York: Barnes,* 1931. 43 pp. Price, $.75.

Merely to announce that Clifford Goldsmith has written a book should send the throngs to the book store to get a copy immediately. In both the text and the sketches Professor Happy is here at his best. From its stunningly brilliant cover to its last hilarious line it is stimulating entertainment for old and young.

This is a book to inspire the health educator; it is first aid for the teacher and the parent; and, for the week-end guest who must take a gift to the children, it's like finding your carfare.

The reviewer's principal advice to the reader is not to start on this book when he is hungry because if he does he will run right out to luncheon and order spinach. HOMER N. CALVER

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Mental Hygiene Publicity—Has an eager public been oversold on mental hygiene? The answer seems to be "no," not on the right kind of educational material, of which more is needed to counteract the efforts of charlatans, faddists, and well-meaning but misguided reformers.

DAVIES, S. P. What Grown-Ups Cry For. Survey Graphic, 20, 3: 253 (Dec.), 1931.

The American Family—What restricted immigration, divorce, birth control, urbanization, industrialism, and other social factors are doing to American statistics. Population is increasing, the sex ratio is becoming equalized, the size of the family is decreasing but there are more families. An excellent and stimulating paper.

DITTMER, C. G. Uncle Sam's Family. Survey Graphic, 20, 3: 249 (Dec.), 1931.

Fish—"Among the many food faddists that have existed, there has not yet been a fish fad." The author thereupon does what he can to make up for the deficiency by featuring fish for fighters, fish for children—whole families, in fact.

GEFFEN, D. H. The Place of Fish in the Dietary of Adults and Children. J. State Med., 39, 11: 656 (Nov.), 1931.

Epidemic Meningitis Movements—The general epidemiologic characteristics of meningitis are studied. The evidence indicates a surprisingly large proportion of the population infected during epidemics. The highly variable inter-epidemic interval is from 6 to 12 years.

HEDRICK, A. W. The Movements of Epidemic Meningitis, 1915–1930. Pub. Health Rep., 46, 46: 2709 (Nov. 13), 1931.

Voluntary Euthanasia—This eloquent plea for the legalization of voluntary euthanasia (easy death) for victims of hopeless, painful conditions was the presidential address delivered at a recent meeting of British Medical Officers of Health.

MILLARD, C. K. The Legalisation of Voluntary Euthanasia. Pub. Health, 45, 2: 39 (Nov.), 1931.

Kentucky Maternal and Child Health Project—How the county health unit has developed its maternal and infant hygiene activities is interestingly set forth in the description of two county projects.

PRATHER, H. E., and GRAFF, E. R. A County Health Department Program for Maternal and Child Health. South. M. J., 24, 11: 963 (Nov.), 1931.

Physical Educational Trends—An excellent statement of the shift in emphasis from physical training to health education, of interest to health workers generally.

ROGERS, J. E. Trends in Physical Education. J. Health & Phys. Ed., 2, 8: 19 (Oct.), 1931.

Research in Nutrition—"We should not look for quick results from improvement in human nutrition . . . the benefit of better feeding usually becomes fully apparent only when continued throughout a large part of the life cycle and often the benefit is greater to the second generation than the first." These observations are a part of a most interestingly presented discussion of some of the vitamins.

SHERMAN, H. C. Some Recent Advances in the Chemistry of Nutrition. J. A. M. A., 97, 20: 1425 (Nov. 14), 1931.

School Children's Teeth—Among the many most important findings of this study of more than 12,000 oral

examinations is this startling one: 90 per cent of children in each age group had one tooth or more decayed, missing or filled.

STOUGHTON, A. L., *et al.* Dental Decay and Corrections Among School Children of Different Ages. Pub. Health Rep., 46, 44: 2608 (Oct. 30), 1931.

What Is Health Consciousness?—Is it an introspective, emotional concern with one's "innards" or a deep concern in applying the present knowledge of health promotion and disease control for the benefit of all? There is plenty of opportunity for speculation in the answer.

SUNDWALL, J. Are We Becoming Overly Health Conscious? J. Health & Phys. Ed., 2, 8: 9 (Oct.), 1931.

Diphtheria Immunity and Tonsillectomy—Schick and Fopper reported a noticeable reduction in Schick test reactors among tonsillectomized children (see Bibliography of Jan., 1930). This finding was not confirmed in a Baltimore study of school children and adults, as no significant difference was discerned between those operated upon and those still enjoying their tonsils, whether in a normal or pathologic condition.

WHEELER, R. E., *et al.* Antitoxic Immunity to Diphtheria in Relation to Tonsillectomy. Am. J. Hyg., 14, 11: 555 (Nov.), 1931.

BOOKS RECEIVED

THE MENTAL DEFECTIVE. By Richard J. Berry and R. G. Gordon. New York: McGraw-Hill, 1931. 225 pp. Price, $2.50.

NURSERY EDUCATION. Report of the Committee on the Infant and Preschool Child—White House Conference on Child Health and Protection. New York: Century Company, 1931. 187 pp. Price, $2.00.

APPROVED LABORATORY TECHNIC. Clinical, Pathological, Bacteriological, Serological, Biochemical, Histological. By John A. Kolmer, Fred. Boerner, assisted by C. Zent Garber. New York: Appleton, 1931. 663 pp. Price, $7.50.

THE BLACK DEATH AND MEN OF LEARNING. By Anna Montgomery Campbell. New York: Columbia University Press, 1931. 210 pp. Price, $3.00.

LIVING THE LIVER DIET. By Elmer A. Miner. St. Louis: Mosby, 1931. 106 pp. Price, $1.50.

PHANTASTICA, NARCOTIC AND STIMULATING DRUGS, THEIR USE AND ABUSE. By Louis Lewin. New York: Dutton, 1931. 335 pp. Price, $3.75.

ALLERGY AND APPLIED IMMUNOLOGY. By Warren T. Vaughan. St. Louis: Mosby, 1931. 359 pp. Price, $4.50.

Conquering Arthritis. By H. M. Margolis. New York: Macmillan, 1931. 192 pp. Price, $2.00.

THE INSECT MENACE. By L. O. Howard. New York: Century, 1931. 347 pp. Price, $3.50.

WHITE HOUSE CONFERENCE ON CHILD HEALTH AND PROTECTION. Health Protection for the Preschool Child. New York: Century, 1931. 275 pp. Price, $2.50.

THE SCIENTIFIC BASIS OF SOCIAL WORK. A Study in Family Case Work. By Maurice J. Karpf. New York: Columbia University Press, 1931. 442 pp. Price, $3.75.

NEWS FROM THE FIELD

POLIOMYELITIS—MULTIPLE CASES IN A FAMILY

Our present conception of the epidemiology of poliomyelitis was well set forth by Aycock in a recent number of the *Weekly Bulletin*. During the course of the present outbreak of poliomyelitis in this city we have kept a record of the number of instances in which two or more cases have occurred in a single family. The results of the inquiry fit in with Aycock's idea that, while the virus of poliomyelitis is widespread, infection going on to paralysis is rare. Were it otherwise we should expect to see multiple cases of the disease in a considerable proportion of the families where the infection has appeared.

From January 1 to October 3 nearly 4,000 cases of poliomyelitis were reported to the Department of Health. The number of families in which more than 1 case occurred was only 111.

These multiple cases are still being analyzed, for it is important to determine in how many instances it seems probable that infection was spread from one patient to the other, and how many probably represented an infection from the same source. The distribution of the multiple cases was as follows:

MULTIPLE CASES OF POLIOMYELITIS IN NEW YORK CITY, JANUARY 1 TO OCTOBER 3, 1931

	Families with 2 cases	Families with 3 cases	Total cases
Manhattan ..	15	0	690
Bronx	10	0	546
Brooklyn	66	1	1,951
Queens	9	1	587
Richmond ...	8	1	151
City	108	3	3,925

—*Weekly Bull.*, City of New York Department of Health.

WESTERN BRANCH MEETING IN DENVER

THE Third Annual Meeting of the Western Branch, American Public Health Association, will be held in Denver, June 2, 3, and 4, 1932. The meeting will adjourn on Saturday, June 4, to the meeting of the National Tuberculosis Association in Colorado Springs, only 60 miles away, which occupies the following week. Eastern representatives to the meeting will include Dr. Louis I. Dublin, Dr. E. L. Bishop, Dr. John A. Ferrell, and Dr. Kendall Emerson.

SCHOLARSHIP IN HEALTH EDUCATION

A FULL tuition scholarship of $500 is available in the field of health education at Massachusetts Institute of Technology (Department of Biology and Public Health) for 1932–1933, to cover the full scholastic year from September to June. This scholarship will be awarded to a candidate recommended by the National Tuberculosis Association, the award to be made in June, 1932. Applications should be received not later than May 15, and those interested are invited to write to the Child Health Education Service of the National Tuberculosis Association, 450 Seventh Avenue, New York, N. Y.

INDUSTRY'S YOUNG WOMEN MOST FREQUENTLY INJURED

THE largest numbers of industrial accidents to New York women for any age group during the years ending June 30, 1929 and 1930, were found to occur among girls 18 and 19, according to a special bulletin of the New York State Department of Labor. Out of a total of 8,091 injuries to women during the first year, 473 were to women

18, and 399 to women 19 years of age. The year following, 591 and 529 respectively were found in the 18 and 19 year groups.

LESLIE DANA GOLD MEDAL

THE Leslie Dana Gold Medal, awarded annually for "outstanding achievements in the prevention of blindness and the conservation of vision," was presented to Edward M. Van Cleve, of New York, Principal of the New York Institute for the Education of the Blind. Mr. Van Cleve was selected for this honor by the National Society for the Prevention of Blindness in coöperation with the St. Louis Society for the Blind through which the medal is offered by Leslie Dana.

The Leslie Dana Medal was awarded last year to Dr. George E. de Schweinitz, of Philadelphia, former President of the American Medical Association, of the American Ophthalmological Society, and the College of Physicians of Philadelphia. In 1929 the Medal was awarded to the late Dr. Ernest Fuchs, of Vienna, Austria, who was recognized in his profession for a number of years before his death as "the world's greatest ophthalmologist."

ROVING WITH THE MIGRANTS

SOCIAL centers among migrant families working in fruit and vegetable canneries and on truck farms and ranches in the Chesapeake area, southern New Jersey, Colorado, and the Pacific Coast, are being conducted in connection with a study of migratory labor by the Council of Women for Home Missions, in which 15 Protestant denominations coöperate. The service given in these centers, as described in a book entitled "Roving with the Migrants," includes day nurseries, first aid, instruction in cooking and nursing, and supervised play.—U. S. Children's Bureau, Washington, D. C.

HOSPITAL SCHOOL IN LISBON

MANUAL work, singing, and drawing, in addition to ordinary elementary school subjects, are being taught to patients 3 to 10 years of age in a hospital in Lisbon, Portugal. This work was established through the efforts of one of the physicians. It is staffed by two trained teachers, and though maintained by private contributions it is officially recognized as a public school. Motion pictures and other entertainments help to interest and amuse the children.—U. S. Children's Bureau, Washington, D. C.

AFTER-CARE FOR INFANTILE PARALYSIS VICTIMS

NEW York City hospitals caring for infantile paralysis patients have been requested to report the discharge of such patients to the Children's Welfare Federation of New York, which has undertaken to see that they have proper after-care. Nursing organizations in each borough have agreed to give treatments under the direction of a physician, and, when necessary, to connect patients with orthopedic clinics and to provide braces and transportation. Cases not registered with the federation will be followed up by health department nurses. This plan has been adopted with the approval of the hospitals and the city commissioners of health, according to an announcement in the *Journal of the American Medical Association*.—U. S. Children's Bureau, Washington, D. C.

DELAWARE'S SCHOOL DENTAL PROGRAM

DELAWARE has this year instituted for its public schools a dental program which requires that all children in the first six grades shall be examined by a dental hygienist. The present first-grade children are to be reëxamined at their completion of the third grade and the sixth, the results of the care received

being recorded. The actual work on the children's teeth is to be done by private dentists selected by the parents, and on completion of the work the dentists are requested to sign the cards on which the hygienists indicated the repairs needed.—U. S. Children's Bureau, Washington, D. C.

PERSONALS

ELEONORE VON ELTZ has become publicity secretary of American Nurses' Association, New York, N. Y.

DR. WILLIAM W. BAUER of Racine, Wis., F. A. P. H. A., has been appointed assistant secretary of the Bureau of Health and Public Instruction, to succeed Dr. Rosco G. Leland, who was elected to the secretaryship of the Bureau of Economics at the February meeting of the American Medical Association Board of Trustees. Dr. Bauer will take up his new duties about the first of the year.

BRIGADIER-GENERAL M. A. DELANEY, U. S. Army, F.A.P.H.A., was recently promoted from Colonel, Medical Corps, by President Hoover. He returned recently from Manila, P. I., where he was Medical Adviser in Public Health and Sanitation to Governors General Henry L. Stimson and Dwight F. Davis. He was formerly White House physician to President Taft.

DON M. GRISWOLD, M.D., DR.P.H., F.A.P.H.A., has been provisionally appointed consulting epidemiologist on the staff of the Division of Communicable Diseases, State Department of Health, Albany, N. Y.

ADMIRAL CARY T. GRAYSON, M.D., an alumnus of the Medical College of Virginia, Richmond, delivered its founder's day address on December 1, to mark the 94th session of the institution. His subject was "The Modern Trend of Medicine."

DEATHS

DR. ROLAND H. STUBBS, former Health Officer of Waterford, N. Y., Member A. P. H. A., died recently in the Leonard Hospital, Troy, N. Y., at the age of 77. He was one of the original staff of the hospital, and was a medical examiner for the New York Life Insurance Company for 35 years.

MAJOR-GENERAL SIR DAVID BRUCE, British medical officer, died recently at the age of 76, on the day of the funeral of his wife. He was best known for his researches on tropical diseases, sleeping sickness and Mediterranean fever, and in 1924 was president of the British Association for the Advancement of Science.

CONFERENCES

January 12–16, Pure Air and Clean Streets Exhibit, New York Academy of Medicine, New York, N. Y.

January 22–23, American Social Hygiene Association, New York, N. Y.

January 25–29, Second Heating and Ventilating Exposition, Cleveland, O.

April 4–8, American College of Physicians, San Francisco, Calif.

April 11–15, American Nurses Association, San Antonio, Tex.

April 11–15, National Organization of Public Health Nursing, San Antonio, Tex.

April 11–15, National League of Nursing Education, San Antonio, Tex.

May 10–15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.

June 2–4, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.

June 6–9, National Tuberculosis Association, Colorado Springs, Colo.

July, The Second International Conference of Social Work, Frankfurt, Germany.